





[PubMed](#)
[Nucleotide](#)
[Protein](#)
[Genome](#)
[Structure](#)
[PMC](#)
[Taxonomy](#)
[OMIM](#)
[Books](#)

Search for

Limits Preview/Index History Clipboard Details

Display Show Send to Hide: ☐ sequence ☐ all but gene, CDS and mRNA features

Range: from to ☐ Reverse complemented strand Features:

1: [AE014137](#). Reports ...[gi:21903746] The record has been replaced by [AE014074](#)

[Comment](#) [Features](#) [Sequence](#)

LOCUS AE014137 50389 bp DNA linear BCT 19-JUL-2002
 DEFINITION *Streptococcus pyogenes* MGAS315, section 2 of 37 of the complete genome.
 ACCESSION AE014137 AE014074
 VERSION AE014137.1 GI:21903746
 KEYWORDS .
 SOURCE *Streptococcus pyogenes* MGAS315
 ORGANISM *Streptococcus pyogenes* MGAS315
 Bacteria; Firmicutes; Lactobacillales; Streptococcaceae; Streptococcus.
 REFERENCE 1 (bases 1 to 50389)
 AUTHORS Beres,S.B., Sylva,G.L., Barbian,K.D., Lei,B., Hoff,J.S., Mammarella,N.D., Liu,M.-Y., Smoot,J.C., Porcella,S.F., Parkins,L.D., McCormick,J.K., Leung,D.Y.M., Schlievert,P.M. and Musser,J.M.
 TITLE Genome sequence of a serotype M3 strain of group A *Streptococcus*: Phage-encoded toxins, the high-virulence phenotype, and clone emergence
 JOURNAL Proc. Natl. Acad. Sci. U.S.A. 99 (15), 10078-10083 (2002)
 REFERENCE 2 (bases 1 to 50389)
 AUTHORS Beres,S.B., Sylva,G.L., Barbian,K.D., Lei,B., Hoff,J.S., Mammarella,N.D., Liu,M.-Y., Smoot,J.C., Porcella,S.F., Parkins,L.D., McCormick,J.K., Leung,D.Y.M., Schlievert,P.M. and Musser,J.M.
 TITLE Direct Submission
 JOURNAL Submitted (14-JUN-2002) Laboratory of Human-Bacterial Pathogenesis, Rocky Mountain Laboratories, NIAID, NIH, 903 South Fourth St., Hamilton, MT 59840, USA
 COMMENT [WARNING] On Jan 26, 2006 this sequence was replaced by gi:21905618.
 FEATURES
 source 1..50389
 /organism="Streptococcus pyogenes MGAS315"
 /mol_type="genomic DNA"
 /strain="MGAS315"
 /serotype="M3"
 /db_xref="taxon:198466"
 /note="group: A"
 gene 215..1507
 /gene="purB"
 /note="synonym: SpyM3_0030"
 CDS 215..1507
 /gene="purB"
 /note="best blastp hit: gb|AAK33173.1| (AE006476) adenylosuccinate lyase [*Streptococcus pyogenes* M1 GAS]"
 /codon_start=1
 /transl_table=11
 /product="adenylosuccinate lyase"
 /protein_id="AAM78637.1"

/db_xref="GI:21903747"
/translation="MIERYSRPEMAAIWTEENKYRAWLEVEILADEAWAELGEIPKED
VAKIREKADFDIDRILEIEQETRHDVVAFTRAVSETLGEERKWWHYGLTSTDVVDTAY
GYLYKQANDIIRRDLENFTNIVADKAREHKMTIMMGRTHGVHAEPTTFGLKLATWYSE
MKRNQERFEHAAAGVEAGKISGAVGNFANIPLFVEQYVCDKLGIRSQEISTQVLPRLD
HAEYFAVLASIATSIERMATEIRGLQKSEQREVEEFFAKGQKSSAMPHKRNPIGSEN
MTGLARVIRGHMVTAYENVSLWHERDISHSSAERIITPDTTILIDYMLNRFNGNIVKNL
TVFPENMMRNMESTFGLIYSQRVMLKLIKGMTREEAYDLVQPKTAYSWDNQVDFKPL
LEEDTKVTSCLTQEEIDELFNPIYYTKRVDDIFKRLGI"

gene 1638..2549
/gene="SpyM3_0031"

CDS 1638..2549
/gene="SpyM3_0031"
/note="best non-GAS blastp hit: gb|AAK76056.1| (AE007488)
transcriptional regulator PlcR, putative [Streptococcus
pneumoniae TIGR4]"
/codon_start=1
/transl_table=11
/product="conserved hypothetical protein"
/protein_id="AAM78638.1"
/db_xref="GI:21903748"
/translation="MLEHFGGKVKVLRLEKRISREDLCGDESELSVRQLARIELGQSI
PSLSKVIFIAKALNVSVGYLTDGADLELPKRYKELKYLILRTPYMDGKLVREEQF
DEIFEDYDKLPREEKVAVDIIQAKFEVYQTDINFGYSILKEFLPQLKRKSIYNLNE
LLLIDLYLIILVVSFSDDIFDVQFYEEITESMLKQHNNLSLEDLFLNNILLSCADT
YIRLKMFGHLKETLQLSHFIMSTIQDFQKMPMYCMYEWKLSIFYLKDINRARNYFEQS
ILFTQMTGDTYLVQKLGEWNKDIHYI"

gene 2769..3767
/gene="ruvB"

CDS 2769..3767
/gene="ruvB"
/note="best blastp hit: gb|AAK33175.1| (AE006476) putative
Holliday junction DNA helicase, subunit B [Streptococcus
pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="putative Holliday junction DNA helicase subunit
B"
/protein_id="AAM78639.1"
/db_xref="GI:21903749"
/translation="MARILDNDVMGNEEFSRDLRPQYLHEYIGQDKVKEQFAIFIEA
AKRRDESLDHVLLFGPPGLGKTTMAFVIANELGVNLKQTSGLPAVEKAGDLVAILNELE
PGDILFIDEIHRMPMSVEEVLYSAMEDFYIDIMIGADTSRSIHLDPPTLIGATTR
AGMLSNPLRARFGITGHMEYYQEKDLTEIVERTATIFEIKIDHEAARKLACRSRGTPR
IANRLKRVRDYAQIIGDGIITAQITDRALTMLDVDREGLDYIDQKILRTMIEMYQGG
PVGLGTLVSVNIAERNTVEEMYEPYLIQKGLMRTRTGRVATQKAYRHLGYPYQNT"

gene 3905..4342
/gene="SpyM3_0033"

CDS 3905..4342
/gene="SpyM3_0033"
/note="best blastp hit: gb|AAK33176.1| (AE006477) putative
protein-tyrosine phosphatase [Streptococcus pyogenes M1
GAS]"
/codon_start=1
/transl_table=11
/product="putative protein-tyrosine phosphatase"
/protein_id="AAM78640.1"
/db_xref="GI:21903750"
/translation="MKKVCVFLGNIICRSPMAEFVMKSIVSSDVMIESRATSDWEHG
NPIHSGTQSILKTYQINYDITKCSKQITITDFNTFDYIIIGMDSNVKNLKEMSQHQWD
SKIYLFREGGVPDPWYTNDFEETYQLVRKGCQDWLSRLMSKEY"

gene 4365..4766
/gene="SpyM3_0034"

CDS 4365..4766
/gene="SpyM3_0034"

/note="best non-GAS blastp hit: gb|AAK76092.1| (AE007492)
conserved hypothetical protein [Streptococcus pneumoniae
TIGR4]; gb|AAL00641.1| (AE008548) hypothetical protein
[Streptococcus pneumoniae R6]"
/codon_start=1
/transl_table=11
/product="conserved hypothetical protein"
/protein_id="AAM78641.1"
/db_xref="GI:21903751"
/translation="MIDMQDIVKKWSITRAKLEIVSVIVILVCAISVFSVRISNKTSL
TYDKGRIHYTGVINHKMNGEGKLVYPNGDIYEGTFKNGLFEGKGTFTAKTGWLYNGE
FHKGQANGKGV LKAKNNKVYKGIFKQGIQK"
gene 4763..6538
/gene="SpyM3_0035"
CDS 4763..6538
/gene="SpyM3_0035"
/note="best blastp hit: gb|AAK33178.1| (AE006477) putative
acyltransferase [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="putative acyltransferase"
/protein_id="AAM78642.1"
/db_xref="GI:21903752"
/translation="MRIKWFSFVRVTGLLLVLLYHFFKNVFPGGFIGVDIFFTFSGYL
ITALLIDEYTKKESIDIIGFLKRRFYRIVPPLVLMILLTIPFTFLIKKDFIANIGSQI
TAVLGFTNIYEILTGSYSQFIPHLFVHTWSLAIEVHFYLFWGVFVWLLARRKETQ
KQLRGLLFLISLGIFAISFLSMSIRSFMSTNFSLIYFSSLSHSPFFLGAMFATITGI
NETTVRFQKNVRLWPRQYVLAAMVGAFTLLLVLTVTLDNFNHTTYLFGFALASLFASI
MIYAARVLHEQTPDVQEPKAITYIADISYGIYLFHWPFYIIFSQMLSHILAVILTVEF
SILFATVSYIIVEPLVQGRKPNNLGLLEIDCSPYYKWIVGGTLALALLTLGTCMIAPKV
GKFEKQLLVSSLQQAQSNMERTHTLAAGDANALSDVGIIGDSVALRSSAAFSKIMPQA
QLDAVSRNFKEAFDLFNNQIKSKSLSKTVVLAVGVNSLDNYSQAVQSFIEALPKGHR
LVLVSPYNAKNASQVAEARDYGLKLSKKYKYVTIADWKVAVEHPDIWYSGDGVHYSE
DSQGAELYVSTIQTAVEKS AKKPAK"
gene 6847..9489
/gene="adh2"
/note="synonym: SpyM3_0036"
CDS 6847..9489
/gene="adh2"
/note="best blastp hit: gb|AAK76091.1| (AE007491) alcohol
dehydrogenase, iron-containing [Streptococcus pneumoniae
TIGR4]"
/codon_start=1
/transl_table=11
/product="putative alcohol dehydrogenase II"
/protein_id="AAM78643.1"
/db_xref="GI:21903753"
/translation="MTEGHNTVETTSVSVTIDALVQKGLAALAEMRKLDQEQVDYIVA
KASVAALDAHGELAKHAYEETGRGVFEDKATKNLFACEHVNNMRHQKTVGII EEDDV
TGLTLIAEPVGVICGITPTNPTSTAIFKSLISLKTRNPIIFAFHPSAQESSAHAARI
VRDAAIAAGAPENCVQWVETPSLEATNALMNHGDIATILATGGNAMVKAAYSCGKPAL
GVGAGNVPAYVEKSANIRQAAHDIVMSKSFNGMVCASEQAVIVDKIYDDFVAEFKS
YHTYFVNKKEKALLEEFCGAKANSKNCAGAKLNPINIVGKPATWISAQAGFTVPEGTN
ILAECKEVSENEPLTREKLSPIAVLKSEREDGVEKARQMVEFNGLGHSAAIHTAD
AELAKEFGTRIRAIRVIWNSPSTFGGIGDVYNAFLPSLTLCGSGYGRNAVGDNDVSAIN
LLNIKKVGRRRNNMQWFKVPSKTYFERDSIQYLQKCRDVERVMIVTDHAMVELGFLDR
IIEQLDLRRNKVVYQIFAEVEPDPTITVMKGTELMRTFKPDTIIALGGGSPMDAAKV
MWLFYEQPEVDFHDLVQKFMDIRKRAFKFPELGKTKFVAIPTTSGTSEVTPFAVIS
DKANNRKYPIADYSLTPTVAIVDPALVLTVPGFIAADTGMDVLTHATEAYVSGMANDF
TDGLALQAIKIVFDNLEKSVKTADFEAREKMHNASTMAGMAFANAFLGISHMAHKIG
AQFHTVHGRTNAILLPYVIRYNGTRPAKTATWPKYNYRADEKYQDIKLLGLSASTP
EEAVESYAKAVYDLGCRVGIQMNFKAQGIDENEWEKHSRELAYLAYEDQCS PANRPLP
MVDHMQEII EDAYYGYAERPGRRK"
gene 9742..10758
/gene="adh1"
/note="synonym: SpyM3_0037"

CDS 9742..10758
/gene="adh1"
/note="best non-GAS blastp hit: gb|AAK74463.1| (AE007341) alcohol dehydrogenase, zinc-containing [Streptococcus pneumoniae TIGR4]; gb|AAK99066.1| (AE008407) Alcohol dehydrogenase, propanol-preferring. [Streptococcus pneumoniae R6]"
/codon_start=1
/transl_table=11
/product="putative alcohol dehydrogenase I"
/protein_id="AAM78644.1"
/db_xref="GI:21903754"
/translation="MKAVVVNQASTGVEVVEHDLPNVGHGEALVKVEYCGVCHTDLHV
AHGDFGQVPGRILGHEGIGIVEEIGEGVTSKVGDRVSIWFFEGCGHCEYCTTGRET
LCRSVKNAGYSVDGGMSEYAVVTADYAVKVPEGLDPAQASSITCAGVTITYKAIKEAGA
APGQWIVIFGAGGLGNLAVQYAKKVFNHVVAVDINNDKLELAKEVGADIVVNGKEIE
DVPGYIQEKTGGAHGVVVTAVSKVAFNQAIDSVRAGGTVVAVGLPSEYMELSIKTVL
DGIKVVGSLVGTRKDLEEAFAFGAEGLVVPVVEKVPVDTAPEVFDEMERGLIQGRKVL
DFIS"

gene 11146..12435
/gene="SpyM3_0038"

CDS 11146..12435
/gene="SpyM3_0038"
/note="best non-GAS blastp hit: gb|AAL00679.1| (AE008551) multi antimicrobial extrusion (MATE) family transporter [Streptococcus pneumoniae R6]"
/codon_start=1
/transl_table=11
/product="putative multi antimicrobial extrusion (MATE) family transporter"
/protein_id="AAM78645.1"
/db_xref="GI:21903755"
/translation="MIYSRRKIFSLALPSMIENILQMLMGMVDNYLVAQIGLVAVSGV
SIANNIISIYQSLFIALGAAVSSLIARSIGENNNQNKQLNMYAGVLQVTLTLLSVGLGLL
SVVGHHQVLEWLGAEASVTLVGGRYLSIVGGMIVSLGLLTSLGAIVRAQGYPKIPMQV
SLLINVLNAIFSALSIYVWGFGLLGVAWATVLSRLVGVFLLCQFIPIKQVAKRLMRPL
DKIIFDLSLPAAGERLMMRAGDVLIIIGIVVRFGTALAGNAIGETLTQFNYPGLAMA
TATIILVARQLGGGKVTEIRYIIREAFILSTLMMLVMGALTYLLGPSLLPLFTQNTDA
QRSAMVLLFSLLGAPATAGTLVYTAVWQGLGKAKLPFYATTIGMWVIRIGLVYVIGV
VWQYGLIGVWMATVLDNTRWFILSKQFKKYQEITFH"

gene 12634..12942
/gene="rpsJ"
/note="synonym: SpyM3_0039"

CDS 12634..12942
/gene="rpsJ"
/note="best blastp hit: gb|AAK33181.1| (AE006477) 30S ribosomal protein S10 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="30S ribosomal protein S10"
/protein_id="AAM78646.1"
/db_xref="GI:21903756"
/translation="MANKKIRIRLKYEHRTLDTAEEKIVETATRTGATVAGPVPLPT
ERSLYTIIRATHKYKDSREQFEMRTHKRLVDIINPTQKTVDALMKLDLPSGVNVEIKL"

gene 13190..13816
/gene="rplC"
/note="synonym: SpyM3_0040"

CDS 13190..13816
/gene="rplC"
/note="best blastp hit: gb|AAK33182.1| (AE006477) 50S ribosomal protein L3 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L3"
/protein_id="AAM78647.1"
/db_xref="GI:21903757"

/translation="MTKGILGKKVGMTQIFTESGEFIPVTVIEATPNVVLQVKTVETD
GYEAVQVGFDDKREVLNPKPAKGHVAKANTAPKRFIREFKNIEGLEVGAELSVEQFEA
GDVVDVTGTSKGGKFQGVIKRHGQSRGPMAGHSRYHRRPGSMGPVAPNRFKNKRLAG
RMGGNRRVTQNLIVQVIEKKNVILVKGNVPGAKKSLITIKSAVKAAC"
gene 13840..14463
/gene="rplD"
/note="synonym: SpyM3_0041"
CDS 13840..14463
/gene="rplD"
/note="best blastp hit: gb|AAK33183.1| (AE006477) 50S
ribosomal protein L4 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L4"
/protein_id="AAM78648.1"
/db_xref="GI:21903758"
/translation="MANVKLFDQTGKEVSSVELNDAIFGIEPNESVVFDDVISQRASL
RQGTHAVKNRSVSGGGRKPWRQGTGRARQGSIRSPQWRGGGVFGPTPRSYGYKLP
QKVRRLALKSVYSAKVAEDKFVAVEGLSFAAPKTAFAKVLALSIDTKVLVLEEEN
EFAALSARNLPNVTVATAATASVLDIVNADKLLVTKEAISTIEEVL"
gene 14463..14759
/gene="rplW"
/note="synonym: SpyM3_0042"
CDS 14463..14759
/gene="rplW"
/note="best blastp hit: gb|AAK33184.1| (AE006477) 50S
ribosomal protein L23 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L23"
/protein_id="AAM78649.1"
/db_xref="GI:21903759"
/translation="MNLYDVIKKPVITEKSMIALEAGKYTFEVDTRAHKLLIKQAVEA
AFDGVKVASVNTVNVKPKAKRVGRYTGFTSKTKKAIITLTADSKAIELFAAEAE"
gene 14777..15610
/gene="rplB"
/note="synonym: SpyM3_0043"
CDS 14777..15610
/gene="rplB"
/note="best blastp hit: gb|AAK33185.1| (AE006477) 50S
ribosomal protein L2 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L2"
/protein_id="AAM78650.1"
/db_xref="GI:21903760"
/translation="MGIKVYKPTTNGRRNMTSLDFAEITTSTPEKSLVSLKSKAGR
NNGRITVRHQGGGHKRHYRLIDFKRNKDGEAVVKTIEYDPNRTANIALVHYTDGVKA
YIIAPKGLEVGQRIVSGPDADIKVGNALPLANIPVGTVVHNIELKPGKGELVRAAGA
SAQVLGQEGKYVLRLQSGEVRMILGTCTATIGTVGNEQQSLVNIGKAGRSRWKGIRP
TVRGSVMNPNDHPHGGGEGKAPVGRKAPSTPWGKPALGLKTRNKKAKSDKLIVRRNE
K"
gene 15749..16027
/gene="rpsS"
/note="synonym: SpyM3_0044"
CDS 15749..16027
/gene="rpsS"
/note="best blastp hit: gb|AAK33186.1| (AE006478) 30S
ribosomal protein S19 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="30S ribosomal protein S19"
/protein_id="AAM78651.1"
/db_xref="GI:21903761"
/translation="MGRSLKKGPFVDEHLMKKVEAQANDEKKKVIKTWSRRSTIFPSF
IGYTIAYVDGRKHVPVYIQEDMVGHKLGEFAPTRTYKGHAADDKKTRR"

gene 16043..16387
/gene="rplV"
/note="synonym: SpyM3_0045"

CDS 16043..16387
/gene="rplV"
/note="best blastp hit: gb|AAK33187.1| (AE006478) 50S
ribosomal protein L22 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L22"
/protein_id="AAM78652.1"
/db_xref="GI:21903762"
/translation="MAEITSAKAMARTVRVSPRKTRLVLDLIRGKKVADAIAILKFTF
NKAARVIEKTLNSAIAANAENNFGLEKANLVVSETFANEGPTMKRFRPRAKGSASPINK
RTTHVTVVVSEK"

gene 16427..17053
/gene="rpsC"
/note="synonym: SpyM3_0046"

CDS 16427..17053
/gene="rpsC"
/note="best blastp hit: gb|AAK33188.1| (AE006478) 30S
ribosomal protein S3 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="30S ribosomal protein S3"
/protein_id="AAM78653.1"
/db_xref="GI:21903763"
/translation="MRVGIIRDWDKAWYAEKEYADYLHEDLAIRKFINKELADASVST
IEIERAVNKVIVSLHTAKPGMVIGKGGANVDALRGQLNKLTGKQVHINIIIEIKQPDLD
AHLVGENIARQLEQRVAFRRRAQKQAIQRTMRAGAKGIKTQVSGRLNGADIARAEGYSE
GTVPLHLTLRADIDYAWEEADTTYGKLGKLVWIYRGEVLPARKNTKGGK"

gene 17057..17470
/gene="rplP"
/note="synonym: SpyM3_0047"

CDS 17057..17470
/gene="rplP"
/note="best blastp hit: gb|AAK33189.1| (AE006478) 50S
ribosomal protein L16 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L16"
/protein_id="AAM78654.1"
/db_xref="GI:21903764"
/translation="MLVPKRVKHRREFRGKMRGEAKGKGEVSFGEYGLQATTSHWITN
RQIEAARIAMTRYMKRGKQVWIKIFPHKSYTAKAIGVRMGSGKGAPEGWVAPVKRGKV
MFEIAGVSEEIAREALRLASHKLPVKCKFVKREAE"

gene 17480..17686
/gene="rpmC"
/note="synonym: SpyM3_0048"

CDS 17480..17686
/gene="rpmC"
/note="best blastp hit: gb|AAK33190.1| (AE006478) 50S
ribosomal protein L29 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L29"
/protein_id="AAM78655.1"
/db_xref="GI:21903765"
/translation="MKLQEIKDFVKELRGLSQEELAKKENELKKELFDLRFQAAAGQL
EKTARLDEVKKQIARVKTQVQSEMK"

gene 17712..17972
/gene="rpsQ"
/note="synonym: SpyM3_0049"

CDS 17712..17972
/gene="rpsQ"
/note="best blastp hit: gb|AAK33191.1| (AE006478) 30S

ribosomal protein S17 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="30S ribosomal protein S17"
/protein_id="AAM78656.1"
/db_xref="GI:21903766"
/translation="MERNQRKTLTYGRVVSDDKMDKTITVVVETKRNHPVYGRINYSKK
YKAHDENNVAKEGDIVRIMETRPLSATKRFRLLVEVVEKAVII"
gene 17997..18365
/gene="rplN"
/note="synonym: SpyM3_0050"
CDS 17997..18365
/gene="rplN"
/note="best blastp hit: gb|AAK33192.1| (AE006478) 50S
ribosomal protein L14 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L14"
/protein_id="AAM78657.1"
/db_xref="GI:21903767"
/translation="MIQQETRLKVADNSGAREILTIVLGGSGRKFFANIGDVIVASVK
QATPGGAVKKGDVVKAVIVRTKTGARRPDGSYIKFDDNAAVLIIRDDKTFRGTRIFGPV
ARELREGGYMKIVSLAPEVL"
gene 18444..18749
/gene="rplX"
/note="synonym: SpyM3_0051"
CDS 18444..18749
/gene="rplX"
/note="best blastp hit: gb|AAK33193.1| (AE006478) 50S
ribosomal protein L24 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L24"
/protein_id="AAM78658.1"
/db_xref="GI:21903768"
/translation="MFVKKGDKVRVIAGKDKGTEAVVLKALPKVNVKIVVEGVGMKKH
QKPNTENPQGAIVEKEAPIHVSINVQVLDKNGVAGRVGYKVVDGKKVRYSKKSGEVLD"
gene 18773..19315
/gene="rplE"
/note="synonym: SpyM3_0052"
CDS 18773..19315
/gene="rplE"
/note="best blastp hit: gb|AAK33194.1| (AE006478) 50S
ribosomal protein L5 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L5"
/protein_id="AAM78659.1"
/db_xref="GI:21903769"
/translation="MANRLKEKYTNEVIPALTEKFNYTSVMAVPKVEKIVLNMGVGDA
VSNAKNLEKAAELALISGQKPLITKAKKSIAGFRLREGVAIGAKVTLRGERMYEFLD
KLVSVSLPRVRDFHGVPTKSFDRGNVTLGVKEQLIFPEISFDDVDKVRGLDIVIVTT
ANTDEESRELLKGLGMPFAK"
gene 19331..19516
/gene="rpsN.1"
/note="synonym: SpyM3_0053"
CDS 19331..19516
/gene="rpsN.1"
/note="best blastp hit: gb|AAK33195.1| (AE006478) 30S
ribosomal protein S14 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="30S ribosomal protein S14"
/protein_id="AAM78660.1"
/db_xref="GI:21903770"
/translation="MAKKSMTAKNKRPAKHSTQAYTRCEKCGRPHSVYRKFKLCRVCF

RELAYKGQIPGVVKASW"
gene 19667..20065
/gene="rpsH"
/note="synonym: SpyM3_0054"
CDS 19667..20065
/gene="rpsH"
/note="best blastp hit: gb|AAK33196.1| (AE006478) 30S
ribosomal protein S8 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="30S ribosomal protein S8"
/protein_id="AAM78661.1"
/db_xref="GI:21903771"
/translation="MVMTDPIADFLTRIRNANQVKHEVLEVPASNIKKGIAEILKREG
FVKNVEVIEDDKQGIIRVFLKYGKNGERVITNLKRISKPLRVYAKRDDMPKVLNGLG
IAIISTSEGLLTDKEARQKNVGGVEIAYVW"
gene 20268..20804
/gene="rplF"
/note="synonym: SpyM3_0055"
CDS 20268..20804
/gene="rplF"
/note="best blastp hit: gb|AAK33197.1| (AE006478) 50S
ribosomal protein L6 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L6"
/protein_id="AAM78662.1"
/db_xref="GI:21903772"
/translation="MSRIGNKVITMPAGVELTNNNNVITVKGPKGELTREFNKNIEIK
VEGTEITVVRPNDSKEMKTIHGTTTRANLNMVVGVSSEGFKDLEMKGVGYRAQLQGTK
LVLSVGKSHQDEVEAPEGITFTVANPTSISVEGINKEVVGQTAAYIRSLRSPEPYKKG
GIRYVGEYVRLKEGKTGK"
gene 20909..21265
/gene="rplR"
/note="synonym: SpyM3_0056"
CDS 20909..21265
/gene="rplR"
/note="best blastp hit: gb|AAK33198.1| (AE006478) 50S
ribosomal protein L18 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L18"
/protein_id="AAM78663.1"
/db_xref="GI:21903773"
/translation="MISKPDKNKIRQKRHRVRGKLSGTADRPRNLNVFRSNTGIYAQV
IDDVAGVTLASASTLDKDVSKGKTKEQAVVVGKLVAERAVAKGISEVVFDRGGYLYHG
RVKALADAARENLKF"
gene 21284..21778
/gene="rpsE"
/note="synonym: SpyM3_0057"
CDS 21284..21778
/gene="rpsE"
/note="best blastp hit: gb|AAK33199.1| (AE006478) 30S
ribosomal protein S5 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="30S ribosomal protein S5"
/protein_id="AAM78664.1"
/db_xref="GI:21903774"
/translation="MAFKDNAVELEERVVAINRVTKVVGGRRLRFAALVVVDGNGR
VGFGTGKAQEVPEAIRKAVEAAKKNMIEVPMVGTTIPHEVYTNGGAKVLLKPAVEGS
GVAAGGAVRAVIELAGVADITSKSLGSNTPINIVRATVEGLKQLKRAEEVAALRGISV
SDLA"
gene 21793..21975
/gene="rpmD"
/note="synonym: SpyM3_0058"

CDS 21793..21975
/gene="rpmD"
/note="best blastp hit: gb|AAK33200.1| (AE006478) 50S ribosomal protein L30 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L30"
/protein_id="AAM78665.1"
/db_xref="GI:21903775"
/translation="MAQIKITLTKSPIGRKPEQRKTVVALGLGKLNSSVVKEDNAAIRGMVTAISHLVTVEDVK"

gene 22191..22631
/gene="rplO"
/note="synonym: SpyM3_0059"

CDS 22191..22631
/gene="rplO"
/note="best blastp hit: gb|AAK33201.1| (AE006478) 50S ribosomal protein L15 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L15"
/protein_id="AAM78666.1"
/db_xref="GI:21903776"
/translation="MKLHELKAAEGSRKVRNRVGRGTSSGNGKTSGRGQKGQKARSGG
GVRLGFEGGQTPLFRRI PKRGFTNINTKEYALVNLDQLNVFDDGTEVTPAILKDAGIV
RAEKSGVKVLGNGELTKKLTIVKAAKFSKSAEAAIIAKGGSIEVI"

gene 22648..23952
/gene="secY"
/note="synonym: SpyM3_0060"

CDS 22648..23952
/gene="secY"
/note="best blastp hit: gb|AAK33202.1| (AE006478) putative preprotein translocase [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="putative preprotein translocase"
/protein_id="AAM78667.1"
/db_xref="GI:21903777"
/translation="MFLKILKDALKIKTVRNKIFFTIFIILVFRIGTHITVPGVNAKS
LEQLSELPLNMLNLVSGNAMRNFVFSMGVSPYITASIVVQLQMDILPKFVEWGKQ
GEVGRRLNQATRYISLVLAFAQSIGITAGFNTLSNVALVKTDPDIKTYLLIGALLTTG
SVIVTWLGEQITDKGFGNGVSMIIFAGI ISSIPSAIATIREDYFVNVKASDLHSSYLI
VGILIIAVLAI VFFTTYVQQA EYKIPIQYTKLMQGAPTSSYLPLKVNPA GVIPVIFAS
SITTIPSTIIPFVQNGRDLPLNRLQEIFNYQTPVGMIVYALLIILFSFFYTFVQVNP
EKTAENLQKNSSYIPSVRPGRETEQFMSALLKKLATVGAI FLAFISLAPIAAQQALNL
SSSIALGGTSLILISTGIEGMKQLEGYLLKRKYVGFMNTAE"

gene 24102..24740
/gene="adk"
/note="synonym: SpyM3_0061"

CDS 24102..24740
/gene="adk"
/note="best blastp hit: sp|P82549|KAD_STRPY ADENYLATE KINASE (ATP-AMP TRANSPHOSPHORYLASE)"
/codon_start=1
/transl_table=11
/product="adenylate kinase"
/protein_id="AAM78668.1"
/db_xref="GI:21903778"
/translation="MNLLIMGLPGAGKGTQAAKIVEEFGVAHISTGDMFRAAMANQTE
MGRLLAKSYIDKGELVPDEV TNGIVKERLAEDDIAEKGFLLDGYPR TIEQAHALDATLE
ELGLRLDGVINIKVDP SCLVERLSGRIINRKTGETFHKVFNP PVDYKEEDYYQREDDK
PETVKRRLDVNMAQGEPILEHYRKLGLVTDIEGNQEITDVFADVEKALLELK"

gene 24858..25076
/gene="infA"
/note="synonym: SpyM3_0062"

CDS 24858..25076

/gene="infA"
/note="best blastp hit: gb|AAK33204.1| (AE006478) putative translation initiation factor IF-1 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="putative translation initiation factor IF-1"
/protein_id="AAM78669.1"
/db_xref="GI:21903779"
/translation="MAKEDVIEIEGKVVETMPNAMFTVELENGHQILATVSGKIRKNYIRILVGDRVTVEMSPYDLTRGRITYRFK"

gene 25102..25218
/gene="rpmJ"
/note="synonym: SpyM3_0063"

CDS 25102..25218
/gene="rpmJ"
/note="best blastp hit: gb|AAK33205.1| (AE006478) 50S ribosomal protein B [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein B"
/protein_id="AAM78670.1"
/db_xref="GI:21903780"
/translation="MKVRPSVKPICEYCKVIRRNGRVMVICPTNPKHKQRQG"

gene 25236..25601
/gene="rpsM"
/note="synonym: SpyM3_0064"

CDS 25236..25601
/gene="rpsM"
/note="best blastp hit: gb|AAK33206.1| (AE006478) 30S ribosomal protein S13 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="30S ribosomal protein S13"
/protein_id="AAM78671.1"
/db_xref="GI:21903781"
/translation="MARIAGVDIPNDKRVVISLTYVYGIGLATSKKILAAAGISEDIRVKDLTSDQEDAIRREVDIAIKVEGDLRREVMNIMKRLMEIGSYRGIRHRRGLPVRGQNTKNNARTRKGKAVAIAGKKK"

gene 25646..26002
/gene="rpsK"
/note="synonym: SpyM3_0065"

CDS 25646..26002
/gene="rpsK"
/note="best blastp hit: gb|AAK33207.1| (AE006478) 30S ribosomal protein S11 [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="30S ribosomal protein S11"
/protein_id="AAM78672.1"
/db_xref="GI:21903782"
/translation="MKKNIESGVAHIHATFNNTIVMITDVHGNALAWSSAGALGFKGSRKSTPFAAQMAEAAAKSAQEHGLKTVEVTVKPGSGRESAIRALAAAGLEVTAIRDVTPVPHNGARPPKRRRV"

gene 26048..26986
/gene="rpoA"
/note="synonym: SpyM3_0066"

CDS 26048..26986
/gene="rpoA"
/note="best blastp hit: gb|AAK33208.1| (AE006478) DNA-directed RNA polymerase alpha subunit [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="DNA-directed RNA polymerase alpha subunit"
/protein_id="AAM78673.1"

/db_xref="GI:21903783"
/translation="MIEFEKPIITKIDENKDYGRFVIEPLERGYGTTLGNSLRRVLLS
SLPGAAVTSIKIDGVLHEFDTI PGVREDVMQIILNVKGLAVKSYVEDEKIIIELEVEGP
AEVTAGDILTDSDIELVNPDPHYLFTIAEGHSLRATMTVAKKRGYVPAEGNKKDDAPVG
TLAVDSIYTPVKVNYQVEPARVGSNDGFDKLTIEIMTNGTIIIPEDALGLSARVLEH
LNLFTDLTEVAKSTEVKTEKVNDEKVLDRTEELDLSVRSYNCLKRAGINTVFDLT
EKSEPEMMKVRNLGRKSLEEVKVKLADLGLGLKNDK"

gene 27001..27387
/gene="rplQ"
/note="synonym: SpyM3_0067"

CDS 27001..27387
/gene="rplQ"
/note="best blastp hit: ref|NP_268487.1| (NC_002737)
ribosomal protein L17 [Streptococcus pyogenes]
[Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="50S ribosomal protein L17"
/protein_id="AAM78674.1"
/db_xref="GI:21903784"
/translation="MAYRKLGRGTSSQRKAMLRDLTTDLLINESIVTTEARAKEIRKTV
EKMITLGKRGDLHARRQAAAYVRNEIASENYDEATDKYTSTTALQKLFSEIAPRYAER
NGGYTRILKTEPRRGDAAPMAIIELV"

rRNA 28313..29647
/product="16S ribosomal RNA"

tRNA 29809..29884
/product="tRNA-Ala"

rRNA 30181..33080
/product="23S ribosomal RNA"

tRNA 33301..33373
/product="tRNA-Val"

tRNA 33379..33449
/product="tRNA-Gly"

tRNA 33484..33557
/product="tRNA-Ile"

tRNA 33580..33651
/product="tRNA-Glu"

tRNA 33662..33751
/product="tRNA-Ser"

tRNA 33761..33834
/product="tRNA-Met"

tRNA 33855..33927
/product="tRNA-Phe"

tRNA 33947..34027
/product="tRNA-Tyr"

tRNA 34034..34104
/product="tRNA-Trp"

tRNA 34116..34188
/product="tRNA-His"

tRNA 34197..34268
/product="tRNA-Gln"

tRNA 34288..34371
/product="tRNA-Leu"

gene 34631..34816
/gene="SpyM3_0068"

CDS 34631..34816
/gene="SpyM3_0068"
/note="best blastp hit: gb|AAK33209.1| (AE006479)
hypothetical protein [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="hypothetical protein"
/protein_id="AAM78675.1"
/db_xref="GI:21903785"
/translation="MSFEIFTLIIGWKLVGYRVMECGSSFKQG DYRLVVHICLLNVRD
EMLSQQGHEDKADWPEP"

misc_feature 35514..36029
/note="region contains multiple probable gene fragments;
best blastp hit= ref|NP_240927.1| (NC_002570) isopentenyl
monophosphate kinase [Bacillus halodurans]
sp|Q9KGK0|ISPE_BACHD
4-diphosphocytidyl-2-C-methyl-D-erythritol kinase (CMK)
(4-(cytidine-5'-diphospho)-2-C-methyl-D-erythritol
kinase)"

gene 36139..36582
/gene="adcR"
/note="synonym: SpyM3_0069"

CDS 36139..36582
/gene="adcR"
/note="best non-GAS blastp hit: gb|AAK76226.1| (AE007505)
adc operon repressor AdcR [Streptococcus pneumoniae
TIGR4]"
/codon_start=1
/transl_table=11
/product="putative repressor protein"
/protein_id="AAM78676.1"
/db_xref="GI:21903786"
/translation="MGTLEKKLDNLVNTILLKAENQHELLFGACQSDVKLTNTQEHIL
MLLSQQRLTNTDLAKALNISQAAVTKAIKSLVKQDMLAGTKDVTVDARVTYFELTELAK
PIASEHTHHHDETLLNVNRLQKFSAKELEIVDKFVTVFAEELEG"

gene 36586..37305
/gene="adcC"
/note="synonym: SpyM3_0070"

CDS 36586..37305
/gene="adcC"
/note="best non-GAS blastp hit: emb|CAA96186.1| (Z71552)
AdcC protein [Streptococcus pneumoniae]"
/codon_start=1
/transl_table=11
/product="ABC transporter (ATP-binding protein)"
/protein_id="AAM78677.1"
/db_xref="GI:21903787"
/translation="MRYISVENLSFQYSEPVLEGITYHLDSGEFVMTGENGAAKST
LIKATLGILQPKAGRVTIAKKNKDGKQLRIAYLPQQVASFNAGFPSTVYEFVKSGRYP
RSGWFRHLNKHDEEHVQASLEAVGMWENRHKRIGSLSGGQKQRVVIARMFASDPDIFV
LDEPTTGMDSGTTDTFYELMHSAHQHGKSVLMITHDPEEVKAYADRNIHLVRNQKLP
WRCFNIHEVETDDEKGGHGA"

gene 37298..38113
/gene="adcB"
/note="synonym: SpyM3_0071"

CDS 37298..38113
/gene="adcB"
/note="best non-GAS blastp hit: emb|CAA96187.1| (Z71552)
AdcB protein [Streptococcus pneumoniae]"
/codon_start=1
/transl_table=11
/product="putative ABC transporter (permease)"
/protein_id="AAM78678.1"
/db_xref="GI:21903788"
/translation="MLDILSYDFMQRAVMAVAISIFAPILGIFLILRRQSLMSDTLS
HVSLAGVALGVVLGISPTITTIIVVLAAILLEYLRVVYKHYMEISTAILMSLGLALS
LIIMSKSHSSSSMSLEQYLFGSIITISMEQVVALFAIAAIIILITVLFIRPMYILTFD
EDTAFVDGLPVRMLSVLFNIVTGVAIALTIPAGALLVSTIMVLPASIAMRLGKNFKT
VILLGIVIGFSGMLSGIFLSYFFETPASATITMIFISIFLLVSLGGMLKKRLF"

gene complement(38153..38536)
/gene="SpyM3_0072"

CDS complement(38153..38536)
/gene="SpyM3_0072"
/note="best blastp hit: gb|AAK33213.1| (AE006479) putative
histidine triad (HIT) protein [Streptococcus pyogenes M1
GAS]"
/codon_start=1

gene /transl_table=11
/product="putative histidine triad (HIT) protein"
/protein_id="AAM78679.1"
/db_xref="GI:21903789"
/translation="MTECIFCHQLKANQLLTQSQYFKVVFDDIDPIQKGYLLLISKDHY
TSLTQLPKEVRYDLINLQAALVAKLEQHLPISGVTSVSNDEKELMDEGTHFHLHLIPRL
TNDSFWEGITINQENWDLAPFLKHL"
complement(38592..39848)
/gene="tyrS"
/note="synonym: SpyM3_0073"
CDS complement(38592..39848)
/gene="tyrS"
/note="best blastp hit: gb|AAK33214.1| (AE006479) putative
tyrosine-tRNA ligase [Streptococcus pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="putative tyrosine-tRNA ligase"
/protein_id="AAM78680.1"
/db_xref="GI:21903790"
/translation="MNIFFELKARGLVFQTTDEQALVKALTEGQVSYYTGYDPTADSL
HLGHLVAILTSRRLQLAGHKPYALVGGATGLIGDPSFKDAERSLQTKETVLEWSDKIK
GQLSTFLDFENGDNKAELVNNDWFSQISFIDFLRDVGKYFTVNYMMSKDSVKKRIET
GISYTEFAYQIMQGYDFYELNDKHNVTLQIGGSDQWGNMTAGTELLRKKADKTGHVMT
VPLITDSTGKKFGKSEGNVWLDADKTSPEMYQFWLNVMDDDAVRFLKIFTFLSLDE
IAEIESQFNAARHERLAQKTLAREVVTLVHGEEAYKQALNITEQLFAGNIKNLNEL
KQGLSNVPNYHVQSEDSNLNVDMLVTAGISPSKRQAREDVQNGAIYINGDRIQDLQDYQ
LSNDDKIDDQLTVIRRGKKKYAVLTY"
gene 39952..42252
/gene="pbp1B"
/note="synonym: SpyM3_0074"
CDS 39952..42252
/gene="pbp1B"
/note="best blastp hit: gb|AAK33215.1| (AE006480) putative
penicillin-binding protein 1b [Streptococcus pyogenes M1
GAS]"
/codon_start=1
/transl_table=11
/product="putative penicillin-binding protein 1b"
/protein_id="AAM78681.1"
/db_xref="GI:21903791"
/translation="MVKWNTKQKRISHQRLGLLDLGPVLLRTLRLLSNFFYIVIFLFG
MMGFMAFGYLASQIESVKVPSKESLVKQVESLTMISQMNYSNLSLISTLDTLLRTP
VANDAISENIKKAIVSTEDEHFQEHKGVVPKAVFRATLASVLGFGEASGGSTLTQQILV
KQVLGDDPTFFKRKSKEIYALALERYMSKDNILCDYLNVSPPGRNNKGQNIAGVEEA
ARGIFGVSAKDLTPQAAPLAGLPQSPIVYSPYLSLSTGQLKSEKDMAYGIKROQNVLYN
MYRTGVLSKKEYEDYKAYPIQKDFIQPGSAIVNNDYLYYTVLADAKKAMYSYLIKRD
KVSSRDLKNDETKAAYEERALTTELQGGYTITTTINKPIYNAMQAAAQFGGLLDDGT
GTVMGNVLTNDATGAVLGFVGGRDYALNQNNHAFNTVRSPGSSIKPIIAYGPAIDQG
LMGSASVLSNYPTTYSQGKIMHADSEGTAMMPLQEALNTSWNIPAFWTQKLLREKGV
DVENYMTKMGYKIADYSIESLPLGGGIEVSVAQQTNAYQMLSNGLYQKQYIVDKITA
SDGTVVYKHENKPIRIFSAATATILQELLRGPITSGATTTFKNRLAAINPWLANADWI
GKTGTTENYTDVWLVLTSTPKVTLGGWAGHDDNTSLAPLTGYNNNSNYLAYLANAINQA
DPNVIGVGQRFNLDPGVIKANVLKSTGLQPGTVNVNGHTFSVGGEMTTSLWSQKGPGA
MTYRFAIGGTDADYQKAWGNFGFRKN"
gene 42516..46082
/gene="rpoB"
/note="synonym: SpyM3_0075"
CDS 42516..46082
/gene="rpoB"
/note="best blastp hit: gb|AAK33216.1| (AE006480) putative
DNA-dependent RNA polymerase subunit beta [Streptococcus
pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="putative DNA-dependent RNA polymerase subunit
beta"

/protein_id="AAM78682.1"
/db_xref="GI:21903792"
/translation="MAGHEVRYGKHRTRRSFSRIKEVLDLPNLIEIQTDSFQDFLDSG
LKEVFEDVLPISNFTDTMELEFVGVEFKPKYTL EEARIHDASYAPIFVTFRLVNKE
TGEIKTQEVFFGDFPIMTEMGTFIINGGERIIVSQLVRS PGVYFNDKVDKNGKVYGS
TVIPNRGAWLELETDSKDIAYTRIDRTRKIPFTTLVRALGFGSDD EIVDIFGESDLVR
NTIEKDIHKNPDSRTDEALKEIYERLRPGEPKTADSSRSLLIARFFDARRYDLAAVG
RYKVNKKLNIKTRLLNQIIAENLVDAETGEILVEAGTEMTRSVIESIEEHL DGD LNK F
VYTPNDYAVVTEPVVLQKFKVVSPI DPDRVVTIVGNANPDDKVRALTPADILA EMSYF
LNLA E GLKVDDIDHLGNRRIRAVGELLANQFRIGLARMERNVRERMSVQDNDVLT PQ
QIINIRPVTA AVKEFFGSSQLSQFMDQHNPLSEL SHKRRLSALGPGLTRDRAGYEVR
DVHYTHYGRMCPIETPEGPNIGLINNLSSFGHLNKYGF IQTPYRKVDRATGRVTNEIV
WLTAD EDEYTV AQANSKL NEDGTFAEEIVMGRHQGN NQEF SASVVDV DVS PKQVVA
VATACIPFLEND DSNR ALMGANMQRAVPLIDPKAPYVGTGMEYQA AHD SGA AVIAQH
NGKVVFSDAEKVEIRRQDGS LDVYHITKFRRSNSGTAYNQRTL VKVG DIVEK GDFIAD
GPSMENGEMALGQNPVVAYMTWEGYNFEDAVIMSERLVKEDVYTSVHLEEF ESETRDT
KLGPEEITREIPNVGEEALKDLDEMGIIRIGAEVKEGDILVGKVT PKGEKDL SAEERL
LHAIFGDKSREVRDTSLRVP HGGDGIVRDVKIFTRANGDELQSGVNMLVRVYIAQKRK
IKVGDKMAGR HGNKGVSRIVPVEDMPYLPDGT PVDIMLNLGVP SRMNIGQVMELHL
GMAARNLGIHIATPVFDGASSED LWDTVREAGMDSDAKT VLYDGR TGEPFDNRVSVGV
MYMIKLHHMVDDKLHARSVGPYSLVTQQPLGGKAQFGGQRFGE MEVWALEAYGASNVL
QEILTYKSD DVTGR LKAYEAITKGKPIPKPGVPESFRVLVKELQSLGLDMRVLDEDDN
EVELRDLDEGEDDDIMHVDDLEKAREKQAQETQEVSETTDEK"

gene 46173..49796
/gene="rpoC"
/note="synonym: SpyM3_0076"

CDS 46173..49796
/gene="rpoC"
/note="best blastp hit: gb|AAK33217.1| (AE006480)
DNA-dependent RNA polymerase, B' subunit [Streptococcus
pyogenes M1 GAS]"
/codon_start=1
/transl_table=11
/product="putative DNA-dependent RNA polymerase beta prime
subunit"

/protein_id="AAM78683.1"
/db_xref="GI:21903793"
/translation="MVDVNRFKSMQITLASPSKVRWSYGEVKKPETINYRTLKPERE
GLFDEVIFGPTKDWEACGKYKRIYKGI VCDRCGVEVTRAKVRRERMGHIELKAPVS
HIWYFKGIPSRMGLTLDMSPRAL EEVYIFAAYVVIDPKDTPLEPKSL LTEREYREKLQ
EYGHGSFVAKMGAEAIQDLLKRVDLAAEIAELKEELKSASGQKR IKA VRRLDVLD AFN
KSGNKPEWMVLNLPVIPPDLRPMVQLDGRFAASDLNDLYRRVINRNNRLARLLELN
APGII VQNEKRMLQEAVDALIDNGRRGR PITGPGSRPLKSLSHMLKGKQGRFRQNL LG
KRVD FSGRSVIAVGPTL KMYQCGVPREMAIELFKPFVMREIVAK EYAGNVKA AKRMVE
RGDERIWDILEEVIKEHPVLLNRAPT LHLRLGIQAFEPVLIDGKALRLHPLVCEAYNAD
FDGDQMAIHVPLSEEAQAEARLLMLAAEHILNPKDGKPVVTPSQDMVLGNYYLT MEDA
GREGEGMIFKDKDEAVMAYRNGY AHLHSRVGIAVDSMPNKPWKDSQRHKIMVTTVGKI
LFNDIMPEDLPYLQEPNNANLT EGT PDKYFLEPGQDIQEVIDGLDINVPFKKKNLGNI
IAETFKRFRTTETSAFLDRLKDLGYHSTL AGLTVGIADI PVIDNKAEIIDA AHRHVE
EINKAFRRGLMTDDDRYVAVTTTWREAKEALEKRLIETQDPKNPIVMMDSGARGNIS
NFSQLAGMRGLMAAPNGRIMELPILSNFREGLSVLEMMFFSTHGARKGMTDTALKTADS
GYLTRRLVDVAQDVIIREDDCGTDRGLLIRAITDGKEVTETLEVR LQGRYTRKSVKHP
ETGEVLIGADQLITEDMARKIVDAGVEEVTIRSVFTCATRHGVCRCYGINLATGDAV
EVGEAVGTIAAQSIGEPGTQLTMRTFHTGGVASNTDITQGLPRIQE IFEARNPKGEAV
ITEVKGNVVEIEEDASTRTKKVYVQGKTGMGEYVVPFTARMKVEVGDEVNRGAALTEG
SIQPKRLL EVRDTLSVETYL LAEVQKVYRSQGV EIGDKHVEVMVRQMLRKVRVMDPGD
TDLLPGTLMDISDFTDANKDIVISGGIPATSRPVLMGITKASLETNSFLS AASFQETT
RVLTDAAIRGKKDHL LGLKENVIIGKII PAGTGMARYRNIEPQAMNEIEVIDHTEVSA
EAE"

gene 49966..50313
/gene="SpyM3_0077"

CDS 49966..50313
/gene="SpyM3_0077"
/note="best blastp hit: gb|AAK33218.1| (AE006481) putative
DNA binding protein [Streptococcus pyogenes M1 GAS]"
/codon_start=1

```
/transl_table=11
/product="putative DNA binding protein"
/protein_id="AAM78684.1"
/db_xref="GI:21903794"
/translation="MYGDWEPWWFIDGWQDDIIDEQQFSDWQEALDYFNQEWQRMKAI
FPSYHSQKNLLATFWEKEDKRWCEDCDEDLQQFHSLLLLLKNKDIVPSNNYIPEFEQRN
DSPQVAYLCKLNL"
```

ORIGIN

```
1  tacaagaaag gagtgagggt gtttccgagt atttgaactc gggctaactt atctcctcaa
61  tacaatatcaa ataatatagaaa ggaaatgggc actagtttca ctaaactgaa cccgagcgga
121 aagctcggaa tttagataaa ccgcctagga cgcaagcgtc cattgttggg ttcctaaaat
181 tcagtcgctt tctggtcgcc cttggatatc taaaatgatt gaacgttatt cacgccctga
241 gatggcggca atttggacag aggaaaataa ataccgtgct tggttggagg ttgagattct
301 ggctgacgag gcatgggcag agttgggtga gattcctaag gaggatgtgg ctaagattcg
361 tgagaaggcg gattttgaca ttgaccgcat tcttgagatt gagcaggaga cgcgtcacga
421 tgtggtggct ttcacgcgtg cagtttctga gacgcttggg gaggagcgca agtgggtgca
481 ctacggtttg acctcgactg acgtggtgga cactgcctac ggttacctct acaagcaagc
541 taacgacatt atccgtcgcg atcttgagaa tttcaccaat atcgtggcag acaaggcgcg
601 tgagcacaaa atgaccatca tgatgggtcg taccacggt gttcatgccg agccaacgac
661 tttcggctct aagttggcga cttggtacag cgagatgaaa cgtaatcagg agcgttttga
721 acatgctgcc gcaggtgtgg aagctggtaa gatttcagggt gccgttggta actttgctaa
781 ttgcctctta tttgtgaac aatatgtctg tgacaaatta ggcattcgtt cacaagagat
841 ttcaacacaa gttcttcac gtgacctcca cgcagaatat tttgcagtgc ttgcaagtat
901 tgcaacttct atcgaacgta tggcgacaga gattcgtggg ctgcaaaagt cagaacaacg
961 tgaagttgaa gaattctttg ccaaagggtc gaaaggtagc tctgctatgc ctcaaaaacg
1021 caaccaatc ggttcagaga acatgacagg gctagcgcgc gtgattcgtg gtcacatggg
1081 gacagcttat gagaacgtgt cactttggca tgagcgtgat atttcacact catcagctga
1141 gcgtatcatc acacgtgaca caactatctt gattgactac atgctcaacc gctttggcaa
1201 tatcgtaag aacttgactg tcttcccgga aaatatgatg cgcaatatgg aatcaacttt
1261 tggtttgatt tatagtcaac gtgttatgct caaattgatt gaaaaaggaa tgacacgaga
1321 agaagcttat gacttagttc aacctaacac agcttattcc tgggacaatc aagtggattt
1381 caaacactt ttagaagaag acaccaaagt tacctcttgt cttacacaag aagaaattga
1441 tgaactattt aatccgattt attacacaaa acgtgttgat gatattttta agcgttttag
1501 gatttaatat aaaaaaaga aggtgattcc cttctttttt atttaaaaaa cgaatgtttt
1561 ctttaaaaaa attaaaaatg ttagttttta attagacgct gtgatataat aaagaaaaca
1621 gttgttggag agaaaccatg ttagaacatt ttggtggaaa agtaaaaagt ttaagacttg
1681 aaaagaggat tagtcgcgag gacttgtgtg gggatgagtc tgaactttct gttcgtcaat
1741 tagcacggat agaactaggt caatccatc caagtttaag taaggttatt tttattgcaa
1801 aagccttaaa cgttagtgtc ggttacttaa ctgatggtgc tgatttagaa ctacctaacg
1861 gttacaaaga attaaaatac cttatcttaa ggacaccaac ttacatggat gatggaaaat
1921 tacaagtacg agaagagcag tttgatgaaa tttttgagga ttattatgat aaattaccag
1981 aggaagagaa agttgctgtt gatattatcc aagcaaaatt tgaagtttat caaacggag
2041 atattaatct cggatatagt attttaaaag aatttctacc acagctaaaa agaaaatcta
2101 tcttataattt aaatgaatta ttacttatag atttgattt gattattctg gtatgttctc
2161 atttttcaga tgatatattt gatgtacagt tttatgaaga aataacagag agcatgttaa
2221 aacaacacaa taatttatca ttggaagatt tatttttact gaataatatc ttattatctt
2281 gtgcggacac ttatattcgt ttgaagatgt tcggtcatct aaaagaaaca ttacaactta
2341 gccactttat aatgtcaact attcaagatt ttcaaaaaat gcctatgtat tgtatgtatg
2401 aatggaagct atctattttt tatttgaag atattaaccg agcacggaat tactttgaac
2461 agtctatttt atttactcaa atgacaggag atacatattt agttcaaaaa ttacggggag
2521 aatggaataa agatattcat tatatttaa taataatttt atgacatgga tgtcatgttt
2581 atttatattt actatagcta tactatctct tataaataat attttttgg agatagaaga
2641 tgttaaaaaa agttaagcca tttttactat tagccgcagt agttgcattt aaagttgctc
2701 gtgtaatgca tgaatttgat tgggtggaatc ttggttaact ctcttttact ttatgttata
2761 atagtcttat ggctagaatt ttagacaatg atgtaatggg aaatgaggag ttttcggatc
2821 ggactcttcg ccctcaatat ctacacgaat atattggaca agataaaagt aaggaacaat
2881 tcgctatttt tatagaagca gctaaaagac gtgacgaatc tttagaccat gttttattat
2941 ttggaccttc aggactggga aaaacaacaa tggcatttgt gattgccaat gaattgggag
3001 ttaattttaa gcaaacctca ggtcctgccc ttgagaaagc tggagatttg gtatgattt
3061 taaatgaatt agaaccaggg gatattttgt ttattgatga aattcaccgc atgccaatgt
3121 ctgtcgagga agtactatat agtgctatgg aagacttcta tattgatatt atgattggcg
3181 ctggagatac tagtcgtagt attcatttgg atctgcctcc atttacattg attggtgcta
3241 ctacacgtgc aggcattgta tctaattccc tcagagctcg ttttggtatc actggtcaca
3301 tggaaatact tcaagaaaag gatttgacag agattgtgga gcgtacagct actatttttg
3361 aaataaaaat agaccatgaa gctgcacgga aattagcttg tcgcagtaga ggaacgcccc
3421 gcattgctaa tcgattacta aaacgaagtgc gtgattatgc tcaaattatt ggtgatggca
```

```
3481 tcataacggc tcaaataact gatagagctt tgactatggt agatgttgac cgcgaaggtc
3541 tcgattacat tgatcagaaa attttacgaa cgatgattga gatgtatcag ggagggccag
3601 ttggtttggg gacattatct gtgaatattg ccgaggagcg taatacagtt gaagagatgt
3661 atgaacccta cttaattcaa aaaggctttc tcatgcgaac acgaacaggt cgtgtagcga
3721 cgcaaaaggc ttatcgtcat cttggctatc cctatcaaaa cacttaatga tttttcaaat
3781 ctaagaaaaa taatctgaac ctgctttttg tgttcggatt ttttgataag ttgacagaaa
3841 attattagat tgattttctc gatatcagtt agaaatttga tataataatt caaaggagta
3901 tttaatgaaa aaagtatggt ttgtctgtct gggtaatat tgtcgaagcc ccatggctga
3961 gtttgtaatg aagtcaatag tatcaagtga tgttatgat atagaaagtc gtgctacttc
4021 tgattgggag catggaaacc ctattcactc aggtacacag tccatattaa aaacttacca
4081 aattaattat gatataacta aatgctccaa gcagataact ataactgatt ttaacacctt
4141 tgactatatt attggtatgg atagcgataa tgtgaaaaat ctcaaagaga tgtcgcaaca
4201 tcaatgggac tctaaaatct acctgtttag agaagggggt gttcctgatc cttggtacac
4261 taacgatttt gaagaaacct accaattagt tagaaaagga tgccaggatt ggctttctcg
4321 tttaatgagt aaagagtatt gatattagaa gttgagtaaa agaaatgata gatattgcaag
4381 atatagtata aaaatggagt attacacggg cgaagttgga aattgtttcg gtgattgtca
4441 tattggtttg tgcaatttct gtttttagcg taagaatttc gaataagaca agtttgacct
4501 atgataaagg gcgtatacac tatactggtt acgtgattaa ccataaaatg aatggagaag
4561 ggaagcttgt ctaccccaac ggtgatatct atgagggtac ttttaagaat ggcctatattg
4621 aaggaagggt aacttttact gctaagacgg gctggttata taacggggaa tttcataaag
4681 gacaagcaaa tggcaaagggt gtgttaaaag caaagaataa taaagtctat aaagggattt
4741 ttaaacagggt gatatttcaa aaatgagaat aaaatgggtt tcgtttgtta gggtaacagg
4801 acctttactg gttttactct accacttttt taaaaatgta tttccaggag gttttattgg
4861 tgttgacatt ttcttcacct tttcaggata tctaatacaca gccctcttga ttgatgaata
4921 cacaaaaaaa gagtctatcg atattatcgg ttttttaaaa agacgctttt atcgaattgt
4981 tcctcctttg gtgttaatga ttttattgac cattcctttt acgtttttta ttaagaagga
5041 tttcattgct aatataggaa gtcagattac agctgtttta ggatttacca ctaatattta
5101 tgaaatattg acgggaagta gttatgaaag ccaatttatt ccacatctct ttgttcatac
5161 gtggagctta gctattgaag ttcattttta cttgttttgg ggtgtatttg tttggttatt
5221 agcttagcgc aaggagactc agaaacaact gagaggacta ctgtttttga tttcttttgg
5281 aatatttgct attagtttct tgagcatgtc tataagatct tttatgacct caaatttttc
5341 cctgatttat ttttcgagtc tttctcacag ttttcccttc tttttagggt cgatgtttgc
5401 cacgataaca ggtattaacg agactactgt tcgatttcaa aaaaatgtac gtttatggcc
5461 gcgccagtat gtccttgctg ctatggttgg agcatttaca cttttgcttg tgctaacggg
5521 cacattggat ttaaccata ttacgacctc tctatttggc tttgcttttg ctagcctatt
5581 cgcacatcatt atgatttatg cagcgcgtgt tcttcatgag caaacaccag atgtacaaga
5641 gcctaaagct atcacttata tagctatgat tagctatggg atttacctct tccattggcc
5701 atttttagct atttttagcc aattaatgtc tcatattttg gcagttattc taacagtttt
5761 cttttcaatc ttgtttgcca ctgtgtctta ctatattgtg gaaccttttg tccaagggtg
5821 aaaaccaaac ctgcttggtt tagaaattga ctgttctcct tactataagt ggattgtagg
5881 agggactctc gccttagcat tattaacttt aggaacttgt atgatatgcg ctaaagttgg
5941 taagtttgag aaacaattgt tggttagttc cctacaacag gctcaaagta atatggagcg
6001 gacacatata ctagctgcag gagacgctaa tgctttgagt gacgtaggta ttattggtga
6061 tttctgagca ttacgctcta gtgcggcatt ctcaaaaatt atgccacaag cgcaactgga
6121 ttcagcgggt agtcggaatt ttaaagaagc tttcgattta ttttaataacc aaattagtc
6181 taagagtcta tctaagactg ttgtcttagc agtaggtgtt aactcgcttg acaactattc
6241 tcaagcagtt cagtctttta ttgaggcatt gccaaaaggt catcgtttag ttttggtttc
6301 tccatataat gccaaaatg ccagtcaggt tgcagaagct agagactatg gtcttaaat
6361 gtccaaaaaa tacaagtatg tcactattgc agactggtat aaagtgtctg ttgaacatcc
6421 agatatttgg tatggcagtg acggtgttca ttatagtga gatagtcaag gagcagaact
6481 atatgtctcc acaatccaga ctgctgttga gaagtcagct aaaaaaccag ctaataaagg
6541 ttaagaaatg tctaagagat aagtcagatc cattgtgctc tggctttttc ttgtgaacaa
6601 atgatgatgg taaaatagta gtactttgag gtttttaaaa gaaagcgggt tcagaaataa
6661 aacggctttt ttttagatata tttctgaaaa aaagttaatg aagaatattg ataccatagg
6721 atttcagaaa taatttgaaa aaaacttcac aaatttatgt tgaaatgatt tacaaaattt
6781 caaaaagtgc tataataatt ttgtaaacaa aattgtgaaa cttttaacaa gataaaggag
6841 tctcaaatga ctgaaggaca taatactgtt gaaacaacct ctgtttctgt gacaattgat
6901 gctcttgctc aaaaagggtt agctgtctct gcagagatgc gtaagcttga ccaagaacaa
6961 gttgattata tcgtagccaa agcttctgtt gctgctttgg atgctcacgg tgaactgct
7021 aaacatgctt atgaagaaac aggtcgcggg gtctttgaag ataaagcaac aaaaaatcta
7081 tttgcttggt agcatgtggt taataacatg cgccatcaaa aaacagtagg aattattgaa
7141 gaagatgatg tgacaggttt gacattaatt gctgagccgg ttggtgttat ctgtgggatt
7201 acaccaacaa ctaaccaaac ttcaacagct atctttaaat ctttgatctc gttaaaaaca
7261 cgtaatccaa ttatttttgc ctttcaccca tcagcacaag aatcatcagc gcatgccgct
7321 cgtattgttc gtgatgctgc tattgccgct ggtgctcctg aaaattgtgt gcagtgggtt
7381 gaaacaccat cacttgaagc aacaaatgct ttgatgaatc atgacggcat tgccactatc
```



```
7441 cttgcgacag gtggaaatgc aatggttaaa ggggcatact catgtgggaa acctgcctt
7501 ggggtaggtg ctggtaacgt tccagcttat gttgaaaaat ctgctaacat ccgccaagcc
7561 gctcatgata ttgtgatgtc taaatcattt gataacggtg tgggtctgtg gtctgaacaa
7621 gctgttatcg tggacaaaga aatctatgac gattttgtag cagaattcaa atcttaccat
7681 acttattttg taaataaaaa agaaaaagcc cttcttgaag aattctgttt tggtgccaaa
7741 gcaaatagca aaaactgtgc tggtgcaaaa ttaaaccaa atattgtagg aaaaccagct
7801 acttggattt cagcacaagc tggatttact gttccagaag gaaccaatat tcttgtgca
7861 gaatgtaaaag aagtttcaga aaatgagcct ttaacacgtg aaaaattatc tccagtcatt
7921 gctgttttga aatctgaatc acgtgaagac ggtgttgaaa aagctcgtca aatggttgaa
7981 tttaatggac tcggtcactc agctgccatt catacagcag atgcagagtt ggcaaaagaa
8041 tttggaacta gaatccgtgc tatccgcgtc atctggaatt caccttctac atttggtggt
8101 atcggggatg tttacaatgc tttcttgcca tcattgactc ttggttggtg ttcgtatgga
8161 cgtaacgcag ttggtgataa cgttagtgtc ataaatctct tgaacatcaa aaaagtagga
8221 agacgtagaa ataatatgca atggtttaaa gttccttcaa aacatactt cgaacgtgat
8281 tcaattcaat atttgcaaaa atgtcgtgac gttgaacgtg tcatgattgt tacagtcac
8341 gctatgggtg agcttgggtt cttggatcgt atcattgaac aacttgatct tcgtcgcaat
8401 aaagtgtgtt atcagatctt tgctgaagta gaaccagatc cagacattac aactgttatg
8461 aaaggtactg aattaatgcg taccttcaaa ccagacacca ttattgccct tggcggggga
8521 tctcctatgg atgcagcaa agttatgtgg ctcttttatg aacaaccaga agttgatttc
8581 catgacctcg tcaaaaatt catggatcgc cgaaacgtg cgttcaaatt ccagaactt
8641 ggtaagaaaa caaaatttgt tgctatccca acaactcttg gaacaggttc agaggtgaca
8701 ccatttgccg ttactctga caaagcaaat aatcgtaaat atccaatcgc tgattactca
8761 ttaacaccaa ctgtagccat tgttgacca gctttggtat tgactgttcc aggttttatt
8821 gctgctgata ctggtatgga cgttttgaca cagcaaccg aagcttacgt gtcacaaatg
8881 gccaatgact ttacggatgg tttagctctt caagccatta aaattgtttt tgataatctt
8941 gaaaaatcag ttaaaacagc cgattttgaa gcacgtgaaa agatgcacaa tgcgtcaact
9001 atggcaggta tggcttctgc caatgcattc ttaggtattt ctcaactcaat ggcgcataaa
9061 attggcgcac aattccatac cgtacacgga cgtacaaatg caattctttt gccgtatgtt
9121 atccgctata atggaactcg tccagctaaa acagcaacat ggcctaagta taattactac
9181 cgtgcggatg aaaaatacca agacattgcy aaattgttag ggtttcagc tctcacca
9241 gaagaagcag tggaaatcta tgcgaaagc gtttatgata tgggttgccg agttggtatt
9301 caaatgaact tcaaagctca aggtatcgac gaaaacgaat ggaaagaaca ttctcgtgaa
9361 ttggcttacc ttgcttatga agaccaatgt tcacctgcta acccacgtct tccaatggtt
9421 gatcacatgc aagaaattat tgaagatgct tactatggtt atgctgaacg tccaggacga
9481 cgtaagtgat ttttaattgt gataccagga aatgatttct tatgattaaa gtcataagaa
9541 atcattttat tttctaaata tatcatttat atccagtgtc agaaaatgta gttaagtatt
9601 ttggcagata ggcaaacagc tataagatta accggttaag tttcagaaac ttttcaggtt
9661 tctgttgact ttcatttga aaagatgtac aatttatttg taaccgatta caaataagtc
9721 attattagat ggaggactga tatgaaagcc gtagttgtta atcaagctag tacagggtgc
9781 gaagtgtgtg agcatgatct tccaaatgtt ggtcatggtg aagcgcttgt taaagtagaa
9841 tactgtggtg tttgtcatac tgatttacac gttgcacatg gcgattttgg tcaggtagca
9901 ggacgtattt tggggcacga aggtattggt atagtagaag aaattggaga aggcgtaaca
9961 tccttaaagg ttggtgatcg tgtctctatt gcatggttct ttgaaggatg tggtcattgc
10021 gaatactgta ctacaggacg tgagacactt tgtcgtagtg ttaaaaatgc tggatagatg
10081 gttgatggag gaatgagtga atatgcagta gtaacagctg attatgcagt taaagttcca
10141 gaaggtttag acccggtcca agcttcttcc attacttgtg ctggtgtaac aacttataaa
10201 gctattaaag aggcagggtg tgctccaggc caatggattg ttatctttgg ggcagggtggc
10261 cttggaaatc tggctgttca atacgctaaa aaagtcttta atgcacatgt tgtcgcagtg
10321 gacattaata atgataaact tgagttagct aaagaagtgt ggcgagatat tgtagttaac
10381 ggcaagaaa ttgaagatgt tccaggctat attcaagaaa aaaccggtgg agcacatggt
10441 gttgtggtaa cggctgtttc taaagtgtgt ttaaccaag caattgatag tgtccgtgcc
10501 ggtgggacag ttgtagccgt aggtcttcca tcagaataca tggaaactgtc tatcgtaaaa
10561 actgttttag atggtatcaa agtggtcgga tcactttagg ggacacgtaa agacttggaa
10621 gaagcctttg cttttggtgc agaaggtctg gttgttccgg ttgtcgaaaa agttccagtt
10681 gacactgctc cagaagtctt tgatgaaatg gaacgtggtt taatccaagg gcgcaagggtc
10741 ttagatttca tcagctaaac atacaaatgt attaaatatg agataagcct aagtgttta
10801 aacttgattc caaataaaat agcactctcg agtatcagaa aacatttttg actcgagagt
10861 gctattttga tacattgaaa gttgctaaat gaagaatata ttatataata gaaaaaattc
10921 ttttggaagt cttttgttct tctgttctct agttataaac gttaggtaaa tgttaaggat
10981 tggcatgtgg tcaattgttg ctgtagcact aagtgtcgtg tatcttggga ctctgctatt
11041 aagatagact ttatgaattc attaatggac caaaataact gaatgagtcc agtgactgtg
11101 tttgaaaaaa tcgtttgatc aagaattttt tattagggga cataaatgat atatagtaga
11161 agaaaaattt tctctttagc tctgccttct atgatagaaa atattttaca gatgttaatg
11221 ggaatgggtt ataattacct ggtggctcaa attggacttg tagcagctctc tggcgtctcc
11281 atagctaaca acattatcag tatttatcag tccctcttta tcgcgctggg agctgctgta
11341 tctagtctga ttgctcgaag tattggagaa aataatcaga acaacaatt aaactatatg
```

```
11401 gcaggtgtct tgcaagtaac actcctcctt tcggtcggct tagggttggt atcagttggt
11461 ggacatcatc aggtgttaga atggctagga gctgaagctt ctgtaacatt ggttgagggg
11521 cgatatctat ccattgtcgg cggatatgatt gttagtctag gacttttaac tagcttagga
11581 gctattgttc gagctcaagg gtatcctaag attcctatgc aggtgagctt attaataaac
11641 gtactcaatg ccattttttc tgcttgtct atctatgtat ggggatttg tcttcttggt
11701 gttgcttggg cgacggtttt atctcgttta gtgggtgtgt ttttactttg tcagtttatt
11761 cctattaaac aggttgcgaa acgattgatg agacctttgg acaaaattat ttttgattta
11821 tcactacctg cgtctggtga acgtttgatg atgagagcag gagatgtcct aattattggc
11881 attgttggtc gctttgggac aacggccttg gcaggtaatg ctattggaga aaccttgact
11941 cagtttaatt acatgcctgg cttagccatg gcaacggcaa caattattct agtggttagg
12001 caactggggg gcggttaagg gactgagata aggtatatta ttagagaagc ttttatttta
12061 tccacctca tgatgctggt tatgggagcc ttgacctatc tgctaggtcc tagcctcttg
12121 ccgctattta ctcaagaatac tgatgctcaa aggtccgcca tggttgtttt acttttttct
12181 ttactaggag ctcccgcaac ggcaggcact ttagtttata cagccgtctg gcagggtttg
12241 ggaaaagcaa agcttccttt ctatgcaaca accataggaa tgtgggtgat tgggattggc
12301 cttggttatg tgattggtgt ggtttggcaa tatggactca taggggtctg gatggcgaca
12361 gtggttagata ataccagtct gtggtttatt ctctctaaac aatttaaaaa gtaccaagaa
12421 attacctttc attaggaagg tagttttttt gaaaaaaatg cctaaaaagc ttgcaatgac
12481 taaatgattc tgttattata ttgtggtgct gtaaaaatac agcttttagc atgatacaag
12541 aggttgcgac acgctcgggt gcattgccac gcaacagggt tcggttttct tgaggagcta
12601 gcctattatc gtaaatagac gagaggagaa aagatggcaa acaaaaaaat ccgtatccgt
12661 ttgaaacgct acgaacaccg tacacttgat acagcggcag aaaaaatcgt tgaactgcga
12721 acacgtacag gtgctacagt tgctggacca gttccacttc caactgaacg cagtctttac
12781 acaattattc gtgcgactca caaatacaaa gattctcgcg aacaatttga aatgcgtaca
12841 cacaacggtt tggtagacat catcaatcca acacaaaaaa ctggttgatg tttgatgaaa
12901 cttgatcttc caagtgggt caacgtagaa atcaaacctt aatcggtgag attttgcaag
12961 tacagttagt gtttgatgga acttgaacac gagctaaact ctacatgaaa aagataaatc
13021 ttctcgaaaa cagaagtttt tgtggttagat tttctatttt tattttgagt ttgacgctct
13081 ttgtatcttg ctatgagcac aaaaaacgct cgtaaaaaac ttttttgagc acaaaaaagc
13141 ctcataaaaa actttttgaa atattattaa gaaaaggaaa tattttctca tgacaaaagg
13201 aatcttaggg aaaaaagtgg gaatgactca aatcttctac gaatcaggcg aattcatccc
13261 tgttactgtc attgaagcaa ctccaaacgt tgtgcttcaa gttaaaactg ttgaaacaga
13321 cggttatgaa gcagttcagg ttggttttga tgacaaacgt gaagtcttga gtaacaaacc
13381 tgccaaaggc catggttcaa aagcaaacac agctcctaag cgcttcattc gtgaattcaa
13441 aaacattgaa ggcttagaag ttggtgcaga attatctgta gaacaatttg aagctggtga
13501 tgttgttgac gtcacaggga catcaaaagg taaaggtttc caagggtgta tcaaacgcca
13561 tggctcaatca cgtggtccta tggctcacgg ttctcgttac catcgctgcc cagggtctcat
13621 gggacctgtt gcgcctaacc gcgttttcaa aaacaaacgc ttggcaggac gtatgggttg
13681 taacctgtga acagttcaaa accttgaaat tgtacaagtt atcccagaaa agaacgttat
13741 ccttgtaaaa ggtaacgtac caggtgctaa gaaatctctt atcactatca agtcagcagt
13801 taaagctgct aaataataag aaaggagaaa acagttaaaa tggcaaacgt aaaactattt
13861 gaccaaaactg gtaagaagt tagctcagtt gaattaaacg acgctatctt cggtatcgaa
13921 ccaaacgaat cagttgtttt tgatgttgta attagccaac gcgctagcct tcgccaaggt
13981 actcatcgcg ttaaaaatcg ttcagcagta tcagggtgtg gacgtaaac atggcgctaa
14041 aaaggaaactg gacgcgctcg tcaaggttct atccgctcac cacaatggcg tgggtgtggt
14101 gttgtctttg gaccaactcc cgttcatac ggatacaaac ttccacaaaa agttcgctgc
14161 cttgcgttga aatcagttta ctacgcaaaa gttgctgaag ataaatttgt agctgtagaa
14221 ggcctttcat ttgcagcacc aaaaactgct gaatttgcaa aagtgtttc agctcttagc
14281 attgatacaa aagtacttgt tcttggtgaa gaaggaaatg aatttgagc actttctgca
14341 cgtaaccttc caaacgtaac tgttgcaact gcagcaactg caagtgttct tgatatcgtg
14401 aacgcagaca aacttcttgt tactaaagaa gcaatctcta caattgagga ggttctttca
14461 taatgaattt gtagcagta atcaaaaaac cagttatcac tgagaagtca atgattgctc
14521 ttgaagcagg caatacact ttcgaagtgt atactcgtgc acacaaactt ttgatcaaac
14581 aagctgttga agctgctttt gacggagtta aagttgcaag tgtaataact gttaacgtta
14641 aaccaaagc aaaacgcgtt ggtcgttaca caggtttcac ttcaaaaact aaaaaagcta
14701 tcatcactct tacagctgat tctaaagcaa tcgagttgtt cgcagctgaa gctgaataat
14761 ctaaggagga aataacgtgg gtattaaagt ttataaacca acgacaaatg gccgtcgtaa
14821 tactacttct ttgattttcg cggaaatcac aacaagcacg cctgagaaat cattgcttgt
14881 ttctcttaag agcaaaagct gtcgtaacaa caatggtcgc atcacagttc gtcaccaaag
14941 tgggtggacac aaacgtcatt accgtttgat cgacttcaaa cgtaacaaag atggcggtga
15001 agcagttggt aaaacaatcg aatatgatcc aaaccgtact gcaaacatcg cacttgtaca
15061 ttactctgac ggtgtgaaag cttacatcat tgcacctaaa ggtcttgaa taggtcaacg
15121 tattgtttct ggtccagatg ccgacatcaa agttggtaac gcacttccat tagcaaacat
15181 tctgtcgggt acagttgttc acaatattga gttgaaacct ggtaaagggt gagaacttgt
15241 tcgtgcagct ggagcttctg ctcaagtact tgggtcaagaa ggtaaatagc ttcttggtcg
15301 tcttcaatca ggcgaagttc gtatgattct tgggtacatgc cgtgcaacta tgggtactgt
```

```
15361 tggtaacgaa caacaatcac ttgttaacat tggtaaagca ggacgtagcc gttggaaagg
15421 tatccgcccacacagttcgtg gttctgtaat gaaccctaac gatcaccacac acggtggtgg
15481 tgaaggtaaa gcaccagttg gacgtaaagc gccatcaact ccatggggta aaccagcgct
15541 tggctctaaa actcgtaaaca agaaagctaa atcagacaaa cttatcgttc gtcgtcgtaa
15601 cgaaaaataa ttttagtaag ttgcttaaaa cttgctgaaa tagcgttaca atagctttgc
15661 tatttattcc gccaaactcg tagagtttg agtcttgctc ttgaactcaa gccgctgtgg
15721 tacattatctt aaaggagaaa actacaaaat gggacgtagt cttaaaaaag gacctttcgt
15781 cgatgagcat ttgatgaaaa aagttgaagc tcaagcaaac gacgaaaaga aaaaagtaat
15841 caaaacttgg tcacgtcgtt caacgatttt cccaagtctt atcgatata caatcgcagt
15901 ttatgacgga cgtaaacatg tacctgttta catccaagaa gacatggtag gtcacaaact
15961 tgggtaattt gcaccaacgc gtacttacaa aggtcacgca gctgacgaca agaaaacacg
16021 tcgttaatatg gaggaggaca caatggcaga aattacttca gctaaagcaa tggctcgtac
16081 agtgcgtgtt tcacctcgta aaacacgttt agtacttgat cttatccgtg gtaagaaagt
16141 tgctgacgca atcgcaatct taaaattcac tccaaacaaa gcagctcgtg ttattgagaa
16201 aactcttaac tcagcaattg ctaacgcaga aaacaacttt ggtttggaaa aagcaaaact
16261 ggtagtatct gaaacattcg ctaacgaagg accaacaatg aaacgtttcc gtccacgtgc
16321 gaaaggttca gcttcaccaa tcaacaaacg tacaactcac gtaactgtag ttgtatcaga
16381 aaaataagga ggtaaaatcg tgggtcaaaa agtacatcca attggtatgc gtgtcggat
16441 catccgtgac tgggatgcga aatgggatgc tgaaaaagaa tacgcggatt accttcatga
16501 agatcttgca atccgtaaat tcattaataa agaattagct gacgcacag tttcaactat
16561 tgaaattgaa cgtgcagtaa acaaagtat tgtttcactt cacactgcta aaccaggtat
16621 ggttatcggt aaagtggtcg caaacgttga cgctcttcgt ggtcaactta acaaaattaac
16681 ttgaaaacaa gaacacatca acatcatcga aatcaaacaa cctgatttag atgtccacct
16741 tgttggtgaa aatattgctc gtcaacttga gcaacgtgtt gctttccgtc gtgtcaaaa
16801 acaagcaatc caacgtacaa tgcgtgcagg agctaaaggg attaaaactc aagtttctgg
16861 tcgtttgaac ggtgctgata tcgctcgtgc tgaaggttat tcagaaggaa ctgttccact
16921 tcacacgctt cgcgctgata tcgactatgc ttgggaagaa gctgacacaa cttatggtaa
16981 acttggcggt aaagtttgga tttaccgtgg agaagttctt ccagctcgtg aaaacactaa
17041 aggaggcaaa taacaaatgt tagtacctaa acgtgttaaa caccgtcgcg aattccgtgg
17101 aaaaatgcgc ggtgaggcta aaggtgttaa agaagtttca ttcggtgaat acggacttca
17161 agccacaact agccactgga ttacaaacgg tcaaatcgaa gctgcccgta ttgcatgac
17221 tcgttacatg aaacgtggtg gtaaagtgtt gattaaaatc tccccacaca aatcatacac
17281 tgcaaaagct atcgggtgtac gtatgggttc tggtaaaggg gcacctgaag gttgggtagc
17341 accagttaaa cgtggtaaaag tgatgtttga aattgctggt gtttctgaag aaattgctcg
17401 cgaagcatta cgtcttgcta gccacaaatt accagttaag tgcaaatcgt taaaacgtga
17461 agcagaataa ggagaagaca tgaaacttca agaaattaaa gattttgtta aagagcttctg
17521 tggattgtct caagaagaac ttgctaagaa agaaaacgaa ctcaaaaaag aattgtttga
17581 tcttcgtttc caagctgcag caggctcaact tgaaaagact gctcgccttg acgaagttaa
17641 gaaacaaatt gcacgtgtta aaactgtgca atcagaaatg aaataataga ttgggaaagg
17701 agaaattcta aatggaacgt aatcaacgta aaactcttta cggacgcgta gtgtctgaca
17761 agatggacaa aacaatcaca gttgtagtgt aaactaaacg taaccacca gtctatggtg
17821 aacgtatcaa ctattctaaa aaatataaag cacatgacga aaacaacgtt gctaaagaag
17881 gcgatatcgt tcgtatcatg gaaactcgcc cactttcagc taaaaaacgt ttccgtcttg
17941 tggaagttag ggaaaaagct gttattatct aatcaaaact aaaggagaaa attgaaatga
18001 ttcaacaaga aactcgcttg aaagttgctg ataatagcgg tgctcgtgag atcttgacta
18061 tcaaagtact tgggtggttca ggacgtaaat tcgctaacat cggtgacgta atcgttgctt
18121 ctgtaaaaca agctactcct ggtggagcag ttaaaaaagg tgatgtggtt aaagctgtta
18181 tcgttcgtac aaaaactggt gcacgccgtc cagacggttc atacatcaaa tttgacgaca
18241 atgctgctgt aatcatccgt gatgataaaa ctctcgcgg aactcgtatc tttggcccag
18301 ttgcacgcga attgctgtgag ggtggctaca tgaagatcgt atcacttgca ccagaagtac
18361 tttaatctca ggttaacaaa cgtagtcctc taggttttcc tagggtgccc atcgggcgct
18421 aagaaataat aggagaacc agaattgttg taaaaaaagg cgacaaagt cgcgtaattg
18481 ctggcaagga caaaggcact gaagctgtag ttcttaaaag acttccaaaa gttaaacaaag
18541 ttattgttga aggtgttggg atgattaaaa aacaccaaaa acctaacact gaaaatcttc
18601 aaggagctat cgtcgaaaaa gaagcaccta tccatgtctc taatgttcaa gtattagata
18661 aaaatggtgt agctggacgt gttggttata aagttgttga cggtaaaaaa gtacgttaca
18721 gcaaaaaatc aggcgaagtg cttgattaat cacgaaggaa aggagaagca taatggcaaa
18781 tcgtttaaaa gaaaaatata ctaacgaagt aattcctgcg ttgacagaga aattcaatta
18841 cacatcagtt atggctgtgc caaaagtgtg gaaaattgtt ctcaatatgg gtgttgggtg
18901 tgctgtatcc aacgcaaaaa acctagagaa agctgcagct gaattagcac ttatctcagg
18961 tcaaaaacca cttattacta aagctaagaa atcaatcgct ggcttccgtc ttcgtgaagg
19021 tgtagcgatc ggtgcaaaag ttaccctccg tggcgaacgt atgtacgaat tcctagacaa
19081 attggttagc gtttctactc ctctgttacg tgacttccat ggcgttccaa caaaatcgtt
19141 tgatggacgc ggaaactaca ctctcggtgt gaaagaacaa cttatcttcc cagaaatcag
19201 ctttgatgat gttgataaag tacgtggtct tgatattgta atcgctacta ctgcaaatac
19261 tgacgaagaa tcacgtgaat tgcttaaggg ccttggaatg ccttttgcaa aataataggg
```

```
19321 ggtaataaaa ttggctaaaa aatctatgat tgctaagaac aaacgtcctg caaaacactc
19381 tacacaagct tatactcgct gtgaaaaatg tggacgtcca cattcagttt accgcaagtt
19441 taaactttgt cgtgtttgct tccgtgaatt ggcttacaaa ggtcaaattc caggtgttgt
19501 caaagcttct tggtaaaaaat atgacacaaa acttaatttg ttcttcagat taagtcttgt
19561 gcttaattaa aacggtgtga gcataagctg ataccaaagt cctttaagga caacattaac
19621 tagtaagtga tagcatcaaa ctgctagtaa gaggagaata taaaaaatgg ttatgactga
19681 cccaattgca gactttttaa cacgtatccg taatgctaata caagtaaaac acgaagtgtt
19741 agaagtacct gcttcaaaaca ttaaaaaagg gattgctgag attcttaaac gtgaaggttt
19801 tgtaaaaaat gttgaagtta tcgaagatga taaacaaggc atcattcgtg tgttcttaaa
19861 atacggaaaa aatggtgagc gtgttatcac taacttaaaa cgtatttcaa aaccaggtct
19921 tcgcgtttac gcaaaacgtg atgacatgcc taaagttctt aacggacttg gaattgcaat
19981 catttcaaca tcagaaggtc ttttgactga caaagaagct cgccaaaaga atgttggttg
20041 agaagtgate gcttacgttt ggtaatttaa gatactaaga gcgtcgtgga caaagtgaac
20101 ataggaaatc tgacgtagcg tgtttacact caaggaagat ttatcttttt cacacagacc
20161 acagctcggtg ttcaattttg aaataaaaat tgaagtatat cattctatca aacccccgtg
20221 aaaactagtc gctatgcggc ttgacaattt aacaggagaa aataaacatg tcacgtattg
20281 gtaataaagt aattactatg cctgcaggcg ttgaattaac aaataacaac aatgttatta
20341 ctgttaaagg ccctaaaggc gaactcactc gtgagtttaa caaaaatatt gaaatcaaag
20401 ttgaagggac tgaaatcaca gttgtacgtc ctaacgactc aaaagaaatg aaaacaatcc
20461 atggtacaac ccgtgctaac ttgaataaca tggttgtagg tgttctgaa ggtttcaaaa
20521 aagatcttga aatgaagggt gtcggttacc gtgctcaact tcaaggtact aaacttgtcc
20581 tttcagtagg taatctcac caagacgaag ttgaagctcc agaaggaatt actttcactg
20641 ttgctaacc cacttcaatc tcagttgaag gaatcaacaa agaagttgtt ggtcaaacag
20701 ctgcttacat ccgtagcttg cgttcaccag agccttacia aggcaaaggg atccgttacg
20761 ttggtgaata cgtacgcctt aaagaaggta aaacaggtaa ataatgttct tagtcgggta
20821 tgggaagtat tgcaccttaa catgctcgat aagttcaatc gacaacttgt caatgagaca
20881 aattgattaa aattaagagg tgaaaattgt gatttcgaaa ccagataaaa acaaaatccg
20941 ccaaaaacgc caccgtcgcg tccgcggtaa actctctgga actgctgac gccacggtt
21001 gaacgtattc cgttctaata caggcatcta cgctcaagtt attgatgac tagcgggtgt
21061 aacgctcgca agtgcacaa ctcttgataa agacgtttct aaaggaacaa aaacagaaca
21121 agccgttgta gtcggcaaac ttgttgctga acgtgcagtg gctaaaggta tttctgaagt
21181 ggtgtttgac cgcggtggat atctctatca cggacgtgtt aaagccttgg ctgatgcagc
21241 tcgtgaaac ggattgaaat tctaataagg aggcacaaaa ataatggcat ttaaagataa
21301 tgcaagtgaa cttgaagaac gcgttgctgc gattaaccgc gttacaaaag ttgttaaagg
21361 tggacgtcgt cttcgttttg cagctcttgt agttgttgtt gatggaaatg gtcgtgttgt
21421 atttggtact ggtaagctc aagaagttcc agaagctatc cgtaaaagcag ttgaagctgc
21481 taagaaaaac atgatgaag taccaattgt tggtaacaac atccctcacg aagtttacac
21541 taacttcggt ggagctaaag tattattgaa accagctgta gaaggttctg gagttgctgc
21601 tgggtggtgca gttcgtgccg tcacgaatt agcaggtgtt gctgatatta cttcaaaatc
21661 tcttggttca aacactcaa tcaacattgt tcgtgcaact gttgaaggat tgaaacaact
21721 taaacgtgca gaagaagttg ccgcacttcg tggcatctca gtttctgact tagcataaga
21781 aaggggatca tcatggctca aattaaaatt actttgacta agtctcctat cggacgtaag
21841 ccagaacaac gtaaaactgt tgttgctctt ggacttggtt aattaaactc ttcagtagtc
21901 aaagaagata atgctgctat ccgtggtatg gtgacagcta tttctcactt ggttaccgtt
21961 gaagatggtt aataagttat aactgtgaaa tctctgattt cataattaaa aatgagcaca
22021 aaaccgactc ttgtagtttg ctttttttagc aacaaacagt agtcggttag tgcgtatctg
22081 tattaagtta ttttgataa cttaagtatc attaatgtat aggcgagttt ctataggag
22141 tccttttccc tcatagaggc gctagcattt tacaaaaaaa aggagaaaaa atgaaacttc
22201 atgaattaaa agctgctgaa ggctcacgta aagtacgtaa ccgtgttgtt cgtgggacat
22261 catcaggtaa tggtaaaaca tctggctcgcg gtcaaaaagg tcaaaaagct cgtagcgggtg
22321 gcggtgtacg tttagttttt gaaggtggac aaacaccatt gttccgtcgt attccaaaac
22381 gtggttttac aaatattaat actaaagaat atgcacttgt gaatcttgat caactgaatg
22441 tttttgatga tggtaacaga gtgactccgg ctattttaaa agatgctggt attgtccgag
22501 ctgaaaaatc aggcgttaaa gtgcttggtt acggtgaatt gactaaaaaa ttgactgtaa
22561 aagcagctaa gttctcaaaa tctgctgaag cagctattat tgctaaagggt ggttcaatcg
22621 aagtcattct atgaggggat actcattatg ttcttaaaaa tactaaaaaa cgcgttaaaag
22681 ataaagactg tacggaataa aattttcttt actatattta tcattcttgt attccgaatt
22741 gggacacata ttaccgtacc tgggtgtaaa gccaaagact tagagcaatt aagtgaactc
22801 ccttctttaa atatgttaaa cttagttagt ggtaatgcga tgagaaattt ctcatgtatt
22861 tcaatggggg ttagcccata tattactgct tctatcgttg ttcagttatt gcagatggat
22921 attttaccta agtttggtga gtggggcaaa caaggtgagg ttggacgtcg taaattaaat
22981 caagcgacgc gctatatttc acttgttttg gcttttgccc aatccattgg tatcactgca
23041 gggtttaata ctttgcgaa cgttgacttt gttgaagcac cagacatcaa aacatattta
23101 ctgatcgggg cattactgac aacaggtagc gttattgtta cctggcttgg agaacaatc
23161 acagataaag gatttggtaa tggcgtatca atgattatct ttgcgggtat tatttcgctc
23221 attccaagtg caattgcaac aattcgtgaa gactattttg taaatgttaa ggcaagtgat
```

```
23281 ttacactcgt cttatctcat tgttgggatt ttaatcatag ctgttcttgc tattgttttc
23341 tttaacaacat atgtccaaca agcgggaatat aaaattccaa tccaatacac aaagctaata
23401 caaggtgcac ctacaagttc atatcttcca ttaaaagtaa atccagccgg cgttattccc
23461 gttatctttg ctagctcgat tacaactatc ccaagtacga ttattccttt tgttcaaaat
23521 ggtagagatt taccgtggtt aaaccgtttg caagaaattt ttaattatca aactccagtc
23581 ggaatgatag tttacgcctt gttgattata ttgttctcat tcttctatac ctttgtacaa
23641 gttaatcctg agaagacagc agaaaatctt cagaagaatt cctcatatat accaagtgtt
23701 cgccctggac gtgagacaga acaatttatg tccgcattgc taaaaaaact agcaaccgta
23761 ggagctatct tcttagcatt tatctcttta gcgccaatag cagcacaaca agctctcaac
23821 ctttcttcta gtattgcttt aggtggaact agtttgctca ttttgatttc aactggatc
23881 gaaggtatga aacagcttga ggggtatctt cttaaagagaa aatatgtcgg atttatgaat
23941 acagcagaat agaatacagg ttgacattgt caaccttcta ttttgttttt aaatgacaat
24001 aagacttggg tatcatcaaa cgatttcttg ttgccatttg aaaacaaaaa ccaaggaaaa
24061 taatttccta ctatgtattt attttaaaag aggaggaaaa gatgaatctt ttaatcatgg
24121 gtttgcggg atctggtaaa gggaccgaac cagctaagat tgttgaagaa tttggtgtg
24181 ctcacatctc aacaggggat atgttccgag cgcgaatggc taatcaaacc gaaatgggac
24241 gtttagctaa aagttatatt gataaagggt aattgggttc tgatgaagtc acaaacggga
24301 ttgtaaaaga gcgcttagct gaggatgata tcgcagaaaa aggttttttg cttgatgggt
24361 atccacgtac tattgaacaa gcacacgcct tagatgcaac acttgaagaa ctaggactcc
24421 gcttagatgg tgttattaat attaaagtag atccatcatg tctttagtag cgtttgagt
24481 gtcgtattat caatcgtaaa actgggtgaa cgttccataa agtggtcaac ccaccagtag
24541 attataaaga agaagattac tatcaacgtg aagatgataa gcctgaaact gttaaacgtc
24601 gtttggacgt caatatggct caaggagaac ctattcttga acactatcgt aagcttggc
24661 ttgttacaga tattgaaggt aatcaagaaa taacagacgt ttttgcagat gttgaaaaag
24721 cgttgctaga actcaaataa attatactaa tctacttgca taagtagatt agtaatgata
24781 tactagttta gtctgactta taattgttac ctctgtgctc agaggacatc aaatcgaaat
24841 ttagggggta cttttgcgtg gcaaaagaag acgtgattga aattgaaggc aaagtagtag
24901 aaacgatgcc aatgcaatg tttactgttg aattggaaaa tggacatcaa attctagcaa
24961 ctgtatcagg aaaaatccgc aaaaattaca ttcgtatttt agtaggtgac cgtgttacag
25021 tagaaatgag tccttatgac ttgacacgtg gacgcacac ataccgcttt aaataatcga
25081 aataattgga gggattaaaa catgaaggtg agaccatcgg ttaaaccaat ttgcgaatac
25141 tgtaaagtta ttcgccgtaa tggctgtgtt atggtaattt gtccgacaaa tccaaaacac
25201 aaacaacgtc aaggataaaa tagaaaggag aaaaaatggc tcgtattgct ggagttgata
25261 ttccaaatga taaacgcgta gtaatttcac ttacttatgt ttacggaatt ggtcttgcaa
25321 catctaaaaa aatcttagca gctgcaggta tttctgaaga tatccgtgtt aaagatttaa
25381 catcagatca agaagatgct atccgtcgtg aagtggatgc aatcaaagt gaaggtgacc
25441 ttcgacgtga agtaaacatg aacattaaac gtttgatgga aatcggttca taccgtgga
25501 tccgtcatcg tcgtggactt cctgtccgtg gacaaaatc taaaaacaat gctcgcactc
25561 gtaaaaggaa agctgttgcg attgcaggta agaaaaata aataggagg taaaaaatt
25621 ggctaaacca acacgtaaac gtcgtgtgaa aaagaacatc gaatctggtg ttgcacacat
25681 tcacgtaca ttaataaca ctattgttat gattacagat gtgcatggtg atgctcttgc
25741 atggtcatca gctggtgctc ttggtttcaa aggttctcgt aaatctactc catttgctgc
25801 tcaaatggct gcagaagctg ctgcaaaatc tgcacaagaa cacggactaa aaactgttga
25861 agtgactgta aaaggtcctg gttcaggctg tgaatcagct attcgtgctc tagcagctgc
25921 aggtcttgaa gtaactgcaa ttcgtgatg gaccctgtg ccacataatg gtgctcgctc
25981 tccaaaacgt cgtcgtgat aatcataata caaatagtac acaagtttcg tttcgagggg
26041 tgaaaaaatg attgagtttg aaaaaccaat aataacaaaa attgatgaaa ataaagatta
26101 cggtagattt gtcacgaac cacttgaacg tggctacgga acaactctag gtaattctct
26161 tcgtcgtgta ctcttgctt cacttccagg tgcagcagta acatcaatta aaattgatgg
26221 agtactacac gaatttgata caatcccagg tgtacgtgaa gatgtcatgc aaattatcct
26281 taatgttaag ggacttgctg tgaaatcata cgtcgaagac gaaaagatta tcgaacttga
26341 agtagaagga ccagcagagg taacagctgg tgatattctt actgacagt atactgaact
26401 tgttaaccog gatcattatc tttttacaat cgctgaagga cattctctac gtgcaacaat
26461 gactgttgct aaaaaacgtg gttatgtgcc agcagaagga aacaaaaaag atgatgcacc
26521 tgtgggtaca ttggcagtag attcaatcta tacgccagtt aaaaaagtta attatcaagt
26581 tgaacctgcc cgtgtaggta gcaatgatgg ctttgataaa ttaacgattg aaatcatgac
26641 aaacggaaca attattcctg aagatgcttt aggtctatct gctcagattt tgatcgaaca
26701 cttaaacctg tttactgatt taacagaggt tgcaaaatct accgaagtaa tgaaagaaac
26761 tgaaaaagtg aacgatgaaa aggtacttga ccgcaccatc gaggagcttg atttatccgt
26821 acgctcatat aactgtttaa aacgtgcagg cattaacact gtcttcgact taacagaaaa
26881 atctgagcct gaaatgatga aagtcgtaaa tcttgacgt aagagccttg aagaagttaa
26941 ggttaaactt gctgacttag gtctcggact aaaaaacgat aaataatata ggaggacaaa
27001 atggcttacc gtaaaactagg acgcactagc tcacaacgta aagcaatgct tcgtgatttg
27061 acgacagatc ttttgatcaa cgaatcaatt gtaacgacag aagcacgtgc aaaagaaatc
27121 cgtaaaacag ttgaaaaaat gattactctt ggtaaacgtg gtgatcttca tgctcgtcgc
27181 caagcagctg catacgttgc taacgaaatc gcatcagaaa attatgatga agctaccgat
```

```
27241 aaatacacat caacgacagc ttttcaaaaa cttttctcag aaattgcacc tcgttatgca
27301 gaacgtaacg gtggatacac tcgtattctt aaaacagaac cacgccgtgg agatgctgct
27361 ccaatggcaa ttattgaatt agtttaattt ttatcaattt tgttgagtgt tatgatgatg
27421 gagtaatcga gagattattc ttagtctagc tctggcttac cgctaggatt tttcctagcg
27481 ggaacactca tcattattgtt aatatgtaac gcttgtttat gaaaggtatc taagctatag
27541 aaacttttta taagcaggcg ttttggtgta ttatgaggtg acactccgcg ttttaagctg
27601 agtaaaacaa taacacagaa gcctcttctg atgcgtttat aaagttttct cagagacaat
27661 aaggtcatta gaataagaaa accttatgca ggtggtttaa gacctctcat gggcaataa
27721 acggtgtaat cccctcattt aaatgttcga aaaaatactt gcacgcgcaa cagatgctca
27781 aactatattg ttagttttat cccctattca atattttatt aataagtatt ttaaaatcct
27841 cttttaattt ggaggtgaaa atatcttttt tactttttaa atctgtcact ttaagccgtt
27901 tccaacaaaa ttgtaaaaaa gtacaaaaaa agtaaaaaaa agagttgaca atgacagtaa
27961 agatatcgta tactaataaa gctgtcagag aggttctctg aacacactta ttgaaaaaag
28021 atgaaaaagt agttgacagg ctatgagaaa cctgatagaa taaagaagtt gtctcttagg
28081 agacgttaag acctttgaga actgaataag acgaaccaa cgtgaggggtg atatggagac
28141 atattaccgg tcaagaaacg agaaataaat ctgtcagcga cagaaggaa cagtaagttc
28201 aaacgcaaat taaagagagt ttgatcctgg ctgaggacga acgctggcgg cgtgccta
28261 acatgcaagt agaacgctga gaactggtgc ttgcaccggg tcaaggagtt gcgaacgggt
28321 gagtaacgag taggtaacct acctcatagc gggggataac tattggaaac gatagcta
28381 accgcataag agagactaac gcattgttag aattttaaag gggcaattgc tccactatga
28441 gatggacctg cgttgattat gctagttggt gaggtaaagg ctaccaagg cgacgataca
28501 tagccgacct gagaggtgta tcggccacac tgggactgag acacggccca gactcctacg
28561 ggaggcagca gtagggaatc ttcggcaatg ggggcaacc tgaccgagca acgcccgtg
28621 agtgaagaag gttttcggat cgtaaagctc tgttggtaga gaagaatgat ggtgggagt
28681 gaaaaaccac caagtacggg taactaacca gaaagggacg gctaactacg tgccagcagc
28741 cgcgtaataa cgtaggtccc gagcgtgtgc cggatttatt gggcgtaaa ctagcgcagg
28801 cgttttttta agtctgaagt taaaggcatt ggctcaacca atgtacgctt tggaaactgg
28861 agaacttgag tgcagaaggg gagagtggaa ttccatgtgt agcggtgaaa tgcgtagata
28921 tatggaggaa caccggtggc gaaagcggct ctctggtctg taactgacgc tgaggctcga
28981 aagcgtgggg agcaaacagg attagatacc ctggtagtcc acgcccgtaa cgtagagtgc
29041 taggtgttag gccctttccg gggcttagtg ccggagctaa cgcattaagc actccgcctg
29101 gggagtacga ccgcaagggt gaaactcaaa ggaattgacg ggggcccgca caagcgggtg
29161 agcatgtggt ttaattcgaa gcaacgcgaa gaaccttacc aggtcttgac atcccgatgc
29221 ccgctctaga gatagagttt tacttcggtg catcggtgac aggtggtgca tgggtgtcgt
29281 cagctcgtgt cgtgagatgt tgggttaagt cccgcaacga gcgcaacccc tattgttagt
29341 tgccatcatt aagttgggca ctctagcgag actgccggtg ataaaccgga ggaaggtggg
29401 gatcagctca aatcatcatg ccccttctga cctgggctac acacgtgcta caatggttgg
29461 tacaacgagt cgcaagccgg tgacggcaag ctaatctctt aaagccaatc tcagttcggg
29521 ttgtaggctg caactgcctt acatgaagtc ggaatcgcta gtaatcgcg atcagcacgc
29581 cgcggtgaat acgttcccgg gccttgtaga caccgcccgt cacaccacga gagtttgtaa
29641 caccggaagt cggtagggtg acctattagg agccagccgc ctaagggtgg atagatgatt
29701 ggggtgaagt cgtaacaagg tagccgtatc ggaaggtgcg gctggatcac ctcccttcta
29761 aggaatgga acacgtttat cgtctattt agttttgaga ggtcttggtg ggccttagct
29821 cagtgaggag agcgctgctt ttgcacgag gaggtcagcg gttcgatccc gctaggctcc
29881 atcaggatag aatcctacta aacttaatac aagtgaagtt gaacacgcaa ctcaattcct
29941 aggaaaatag acaatcttgc cttgtgtgca aggcacacat ggtcagattc ctaattttct
30001 acagaagttt cgctaaagcg agcgttgctt agtatcctat ataatagtc attgaaaatt
30061 gaatatctat atcaaatcc acgatctaga aatagattgt agaaaagtaa caagaaaata
30121 aaccgaaaac gctgtgatta ttaataaagt tttctagttt aaaaaaact aggttaataa
30181 ggttaagtta ataagggcgc accggtgatg ccttggcact agaagccgaa gaaggcgtg
30241 acaaacgacg aaatgctttg gggagctgta agtaagcgt gatccagaga tgcctgaatg
30301 ggggaaccca ctaactaatg gttagtatcc ataactgtta aggttatgag aaggaagacg
30361 cagtgaactg aaacatctaa gtatctgcag gaagagaaag caaacgcgat tgccttagta
30421 gcggcgagcg aaacggcagg agggcaaac gaagtgttta cacttcgggg ttgtaggact
30481 gcgacgtggg actttaaaag gatagaagaa ttacctggga aggttaagcca aagagagtaa
30541 aagcctcgta tttaaaattc ttttgagccc tagcagtatc ctgagtacgg cgagacacgt
30601 gaaatctcgt tggaaatcgt gaggaccatc tcccaaccct aaatactctc tagtgaccga
30661 tatgaacca taccgtgag ggaaggtgca aaagcaccgc gggaggggag tgaatatgaa
30721 cctgaaaccc gtgctctaca acaagttcga gcccgtaaat gggtagagac gtgccttttg
30781 tagaatgaac cggcgagtta cgatatgatg cgagggttaag ttgaagagac ggagccgtag
30841 ggaaaccgag tcttaatagg gcgatttagt atcatgttgt agaccgaaa ccatgtgacc
30901 taccatgag caggttgaa gtagaggtaaa actcactgga ggaccgaacc agggcacgtt
30961 gaaaagtgt tggatgactt gtgggtagcg gagaaattcc aaacgaactt ggagatagct
31021 ggttctctcc gaaatagctt tagggctagc gtcgatgtta agtctcttgg aggtatagca
31081 ctggttgggt gaggggtcca tctcggatta ccaatctaga taaactccga atgccacga
31141 gatatcatcg gcagtcagac tgcgagtgtc aagatccgta gtcgaaaggg aaacagccca
```



```
31201 gaccaccagc taaggtccca aaataactgt taagtggaaa aggatgtggg gttgcacaga
31261 caactaggat gttagcttag aagcagctat tcattcaaag agtgcgtaat agctcactag
31321 tcgagtgacc ctgcgccgaa aatgtaccgg ggctaaaaca gtttaccgaa gctgtggatg
31381 acacaaaagt gtcatggtag gagagcgttc tatgtgtgaa gaaggtgtac cgtgaggagc
31441 gctggaacgc atagaagtga gaatgccggg atgagtagcg aaagacaggt gagaatcctg
31501 tccaccgtaa gactaagggt tccaggggaa ggctcgtccg ccctgggtta gtcgggacct
31561 aaggagagac cgaaagggtg atccgatggc caacaggttg atattcctgt actagagtat
31621 atagtgtatg agggacgcag taggctaact aaaccggacg attggaagag tccggctaag
31681 cagtgaaggc taagatgagt caaatgctta tctttataac attgagctgt gatggggagc
31741 gaatttttagt agcgaagtta gtgatgtcac actgccaaag aaagcttcta gcgtttaatg
31801 atactctacc cgtaccgcaa accgacacag gtagtcgagg cgagtagcct caggatgatc
31861 agagaactct cgttaaggaa ctccggcaaaa tgaccccgta acttcgggag aaggggtgct
31921 gacttaggtc agccgcagtg aataggccca agcaactgtt tatcaaaaac acagctctct
31981 gctaaatcgt aagatgatgt ataggggggt acgcctgccg ggtgctggaa ggttaagagg
32041 aggggttagc gcaagcgaag atctgaattg aagccccagt aaacggcggc cgtaactata
32101 acggctcctaa ggtagcgaaa ttccttgtcg ggtaagtccc gaccgcacg aaaggcgtaa
32161 tgatttgggc actgtctcaa cgagagactc ggtgaaattt tagtacctgt gaagatgcag
32221 gttaccgcgc acaggacgga aagaccccat ggagctttac tgcagtttga tattgagtat
32281 ctgtaccaca tgtacaggat aggtaggagc cattgacttc gggacgccag tttcgaatga
32341 ggcgttggtg ggatactacc cttgtgttat ggctactcta acccagatag gttatcccta
32401 tcggagacag tgtctgacgg gcagtttgac tggggcggtc gcctcctaaa gagtaacgga
32461 ggcgcccaaa ggttccctca gattggttgg aaatcaatcg cagagtgtaa aggtataagg
32521 gagcttgact cgcagagcta caactcgagc agggacgaaa gtcgggctta gtgatccggg
32581 ggtaccgaat ggaagggcca tcgctcaacg gataaaagct accctgggga taacaggcct
32641 atctcccca agagttcaca tcgacgggga ggtttggcac ctcgatgtcg gctcgtcgca
32701 tcctggggct gtagtcggtc ccaagggttg ggctgttcgc ccattaaagc ggcacgcgag
32761 ctgggttcag aacgtcgtga gacagttcgg tccctatccg tcgcgggcgt aggaaatttg
32821 agaggatctg ctctagtagc gagaggacca gagtggactt accgctggtg taccagttgt
32881 cttgccaaag gcactgctgg gtagctatgt agggaagga taagcgtga aagcatctaa
32941 gtgcgaagcc cccctcaaga tgagatttcc catgatttta tatcagtaag agccctgaga
33001 gatgacagg tagatagggtt aggagtgtaa gtgtagcgat acatgtagcg gactaatact
33061 aatagctcga ggacttatcc aaaaagaaat attgacaacg ttacggattc ttgttagact
33121 atagatattc aattttgagt gggttatgaa aatagcacat ttacaagtta agtgacgata
33181 gcctaggaga tacacctgta cccatgccga acacagcagt taagccctag aatgcctgat
33241 gtagttgggg gttgccccct gtgagataag gtagtcgctt agcttaatga cacactcaat
33301 gggagtttag ctacgtggg agagcatctg ccttacaagc agagggtcag cggttcgatc
33361 ccgttaactc ccatttttagc ggttgtagtt tagtggtaaa actacagcct tccaagctgt
33421 tgcgcgagtg tcgattctcg tcaccgcgtt tatagttttc ccaagctata tcaataaaaag
33481 cttgggcgcg tagctcaggt ggtagagcgc cagcctgat aagcgtgagg tcggtggttc
33541 gagtccactc gtgccatta tctataatta tattattatg gtccgttggg caagggggtta
33601 agacaccgcc ttttcacggc ggtaacacgg gttcgaatcc cgtacggact atattatatt
33661 tggaggatta cccaagtccg gctgaaggga acggtcttga aaaccgtcag gcgtgtaaaa
33721 gcgtgcgtgg gttcgaatcc cacatctccc ttttaactat cgcgggatgg agcagttagg
33781 tagctcgtcg ggtcataaac ccgaagtcg taggttcaaa tctgtctccc gcaatacata
33841 agtatgtagt gtttggtcgc gtagctcagt tggtagagca atggattgaa gctccatgtg
33901 tcggcggttc gattccgtct cgcgccatta aaatttaata ttttacggaa agatagcgaa
33961 gaggctaaac gcggcgact gtaaattccgc tccttcgggt tcgggggttc gaatccctct
34021 ctttccatcc taaacgggca tagtttaaag gtagaactaa ggtctccaaa accttcagtg
34081 tgggttcgat tcctactgcc cgtgttagaa atatggcggg tgtggtgaag tggttaacac
34141 atcagattgt ggctctgaca ttcgtgggtt cgattcccat cactcgcta ttttattggg
34201 gtatagccaa gcggtaaagg aagggaactt gactccctca tgcgttgggt cgaattccagc
34261 taccacagtt taaattttat atttaaagcc ggcgtggcgg aattggcaga cgcgtggac
34321 tcaaaatcca gtgtccgcaa ggacgtgccg gttcgacccc ggccgccggg atacttgaaa
34381 aacaaggttt gtaaaccctg ttttttgttt tgatcttaag ctgtagctac gtagtacaat
34441 ctcttatatt actgataagg tctatttaat gcgcaagatt tgtggtatga tgaatatgat
34501 tgagtattga tgctttatgg gattaccggt aaggttttga aaaaggtttg tcactactag
34561 gtgctttttt agctatagaa agacagttat ggattgatgt attgtaacta atgttggagg
34621 ttaatgggtg ttgagttttg agatatattc actgataatc ggggtgaaac tgggtgggta
34681 tcgggtaaat gagtgtggtt cttcgtttaa gcaaggagat tatcgtttgg tggttcatat
34741 ttgcttggtt aatgttaggg atgagatgct gagtcaagaa ggccatgaag ataaagctga
34801 ctggccagag ccttgagatg tgacgtttgg tggaaagtcct ttttgggtgag atggcacagc
34861 atatagtaat attagatcct gaggaagaat tgggactttc attaggcttg actggggtat
34921 gacctcactt tacaattcat ttcgatgatg ggtttgatga tatgttttta gttcaggact
34981 ttgtagagtt ggagaatttg gttctttatg aggaagaagt gcaggtaatt cgttgagtca
35041 gtcgtgaaga tatttttagt atgattgatg aaggttcgtt cattccttat ctgaagtata
35101 aaataaaatt gtgctttgag atggttggcc aatataaagt ccatcaatct tagaagtaat
```

```
35161 aattttttgaa ttttttctga ggtttgtgta tatttgatag tgtactgatg taagaagtaa
35221 ggagtactat gatggcaatc aatgagagag cttctgcaaa aatcaagtta ggccttgata
35281 ctaagaataa gcgatgagat ggttaccacg atttatcgat ggtcatgatg agtattgatc
35341 tgtgtgacta tgtgacgggt gaccataatag atgacaataa gattgtcttt gcctcaaact
35401 gtccgaaaaa acctattaac taagataatg atgtttataa gatagttcag ctaatgaaac
35461 atcgatttca agttaaaaaga ggagtttccg tttacttgga aaagcggatt cccatgtgtg
35521 ctgggtatggg aggaggttct agcgatgctg ttactatcag agcattaaat cagttatggc
35581 tccttactct tagccgaaaaa gatatgtagg atatttggtat accgattggg agtgatgtgc
35641 cttattgctt gctttcaggt tgtgcccaag tctactggtaa aggtgaagtg gtttgcgcga
35701 ttttggggct gttatcgtct tgggtgggtt tggttaaacc agattttggg atctcgactt
35761 gaacaatttt tctagatatt aattgtaaaa ccatttcaag agtgtctact actcatttgg
35821 ttgcggcgat tgaagcgggt aactataatg atgggataat gactgaaatg aacaatttgc
35881 tggaagatat tttcattgcc aagcgacctt ttattcaaaa aataaaaagag aaaacactgc
35941 aagctgggtgc tctactactt ttgatgacag gaagtggacc gactgttttt gctttgtgcc
36001 agaccgaaaa acaaaactata atagttaaaa aggactttgc aaggaagttt ttaaggtgag
36061 aatgttgtaa tattttgttg ggattgcttc tttggaagct tcatgttata attaactggg
36121 taatgaaaga ggagatttat ggggacttta gaaaaaaaac ttgataactt agtaaatact
36181 attttattaa aagcagaaaa tcagcatgag ttattatttg gagcttgtca aagtgcggtt
36241 aagcttacta atacgcaaga acatatttta atgttactat ctacgcaacg tctcactaat
36301 acagatttgg ctaaggcatt aaatattagt caggcggcag taactaaggc tatcaagagt
36361 ttggtcaaac aagacatgct agcaggaact aaggatacgg ttgatgctag ggtgacttat
36421 ttgaattaa ccgagtttag taagcctatt gcatcagaa ataccatca tcatgatgaa
36481 actttaaatg tttacaaccg tttattacaa aaattctctg cgaaagaatt agagattgta
36541 gataagtttg taacagtttt tgctgaggaa ttagaagggg aatccatgag atacatatca
36601 gtggaaaatc tctcctttca atatgaaagt gagccagttt tagaagggat cacttatcat
36661 ttagatagtg gagaatttgt caccatgacc ggtgaaaatg gtgctgcaaa gtcaacctta
36721 ataaaagcaa ccttaggaat tttacaacca aaggctggac gagttactat tgctaaaaaa
36781 aataaagacg gtaaaccaatt aagaattgct tacttgccgc agcaagtagc tagctttaac
36841 gctggttttc catccaccgt ttacgagttt gtcaaatacag gtcgctacc acgtagtggg
36901 tggtttagac atttgaacaa acacgatgaa gagcatgtgc aagcaagctt agaagcgtc
36961 ggcgtgtggg aaaaccgtca taagaaattt ggtagtatat cagggtgtca aaaacaacgt
37021 gtggttattg cccgtatggt tgcttctgac cctgatattt ttgtgctaga cgagccaaca
37081 acgggaatgg atagcgttac tactgatacc ttttatgaac tgatgcacca cagtgcacat
37141 caacatggga aatccgttct gatgattacc catgaccacg aagaagtga ggcttatgct
37201 gatcggaaca ttcatttagt cagaaatcaa aaacttcctt ggcgttgttt caacattcat
37261 gaagtgtaaa cagatgacga aaaaggaggt catggtcatg cttgatattt tatcctatga
37321 tttcatgcaa cgggcggtaa tggcggtagt tgccattagt atttttgctc cgatttatgg
37381 tattttcctt attttactg gtcaaagttt gatgacgat acccttagtc atgtttcttt
37441 ggctggggta gcgcttgggg tagttcttgg tatttcacca accatcacta ctattattgt
37501 tgtggtttta gctgctattt tgtagaata cctgcgtgta gtttacaac actacatgga
37561 gatttcaacg gcgattttga tgtcacttgg cttggcccta tctctgatta ttatgagtaa
37621 gtcgcatagt tcatcaagca tgagtttaga acaatacctt tttggatcga tcatcacgat
37681 tagtatggaa caagttgtcg ccttgtttgc tattgctgcg attattttaa tcttgaccgt
37741 tctcttcatt agaccgatgt acattctgac ctttgatgaa gatactgctt ttgtatagg
37801 ttgtcccgtt cgcttgatgt ctgttctatt caatatcgct actgggggtg ctattgcttt
37861 gaccattcca gcagcaggag cacttttggg ttctaccatt atggtcttgc cagcaagtat
37921 cgcaatgaga ttgggtaaaa acttttaaac agttatctta ctgggaattg tcatcggttt
37981 tagcggtagt ttatctggta ttttcttacc ttatttcttt gaaacgccag ctagtgccac
38041 tattaccatg attttcatta gcattttcct cttagttagt ctaggtggaa tgcttaaaaa
38101 acggttattt taataagaaa aatcctcaca tgtttaacat gtgaggattt atttataaat
38161 gctttaaaaa gggggcaagg tcccaatttt cttgattaat ggtgatgcc tcccaaaagc
38221 tatcattagt taaacgagga atcaaatgaa ggtgaaaatg agtcccctca tccatcaact
38281 ccttgtcatt gctgacgcta gtgacgcctg aaatgggaag gtgctgctct agcttagcaa
38341 ctagagcggc ttgtaagttg atgagatcat agcgcacttc ctttggtagt tgtgtcagac
38401 tagtgtaatg gtctttggaa atcagtaaaa ggtaccctt ttggatagga tcaatatcaa
38461 aaacaacctt gaaatatgta ctttgagtca gtagctgatt tgctttgagc tgatggcaaa
38521 agatacatto tgtcataagt acatctcctt atgaaaaaac gagccagagc tcagctcgtt
38581 taatcggtta tctagtaagt gagaacagcg tattttttct taccgcggcg aataacgggt
38641 aattgatcat caatttatc atcattactt aattggtaat ctaaatcttg aatgcgggtc
38701 ccgttaaatg agattgctcc attttgacg tcttcacgcg cttggcggtt tgatggggaa
38761 atacctgcgg tgacaagcat gtcaacaagg ttaaggctgt cttctgattg aacgtgataa
38821 tttgtacat tgctcaatcc ttgtttta atcattagcag aaagattttt gatgtttcca
38881 gcaataaact gctcggtaat gtttaagagct tgtttataag cttcttcgcc atgaaccaag
38941 gtaactactt cgcgtgccaa ggttttttga gcgagacgct cgtgacgagc ggcattaaat
39001 tgactttcaa tttctgcaat ctcatctaga gataagaagg tgaagatttt caagaaacgc
39061 actgcatcat catccatgac atttaaccag aattggtaca tctcgtaagg agacgtctta
```



```
39121 tgggcatcaa gccagacagc attaccttct gatttaccga attttttccc ggttgagtca
39181 gtgatgagtg gtacagtcac gacgtgcccc gttttatcag cctttttgcg gagcaattca
39241 gtaccagctg tcatattgcc ccactggtca gagccgcca tttgtaagg tacattatgc
39301 ttgtcattga gttcgtagaa gtcgtaaccc tgcattgatt ggtaagcaaa ctcatgttaa
39361 gaaatgcctg tttcaatgcg ttttttaaca gagtctttac tcatcatgta gttaacgggtg
39421 aagtatttac cgacatcacg gaggaagtca ataaagtga tttgcgagaa ccagtcgtag
39481 ttgttgacaa gctctgcttt attatcacca ttttcaaaat caaggaaagt agacaactgc
39541 cctttaactc tgtcactcca ctccaaaact gtttctttgg tttgaaggct gcgctctgca
39601 tctttaaagg aaggatcacc aattaaacct gtggcaccac ccacaagagc gtaagggttg
39661 tgccctgcta gttgcaagcg acgagatggt aagatagcca ctatagggcc cagatgaagg
39721 ctgtcagcgg ttggatcata accggtataa taggatactt gcccttctgt taatgctttg
39781 acaagggctt gttcatcagt tgtttgaaag accaagccac gagctttgag ttcttcaaaa
39841 atattcatag gctttctcca ttttcattat agtttcgaat cattatatca aaaaacgcta
39901 ctgcatgca agctttatca aagtttggtat taatgataaa tgaggatatt tatggtgaaa
39961 tggaaacacga aacaaaagcg tataagtcat caaagattag gtctcttgga tttggggcgg
40021 ttgctattac gtacgttgag actactgtct aacttttttt atattgttat ctctcttttt
40081 ggaatgatgg gatttggtat ggcatttggt tatttggtta gtcagattga atctgttaag
40141 gtaccaagta aagaaagttt agtcaaacaa gttgaatcat taacgatgat ttcgcaaatg
40201 aactattctg ataatagttt aatttctact ttagatacgg atttacttcg aacaccagta
40261 gctaattgat cgatttcaga gaatatcaaa aaagctattg tatcaacaga agacgaacat
40321 tttcaagaac ataaagggtg cgtgccaaaa gctgtttttc gggcaacatt ggcttctgta
40381 ttgggatttg gagaagctag tggaggttcg acctaacac agcaattggt caaacaccaa
40441 gttttgggag atgatccac atttagcgcg aagtctaagg agatcgttta cgctcttgcc
40501 ttagagcggt atatgtccaa agacaatatc ttatgtgatt atcttaatgt ttcacctttt
40561 ggtcgtaaca acaagggcca aaatattgct ggtgttgaa agctgcgcg tggcattttt
40621 ggcgtttctg ccaaagattt aacggtgcca caggcagcat ttttggcggg gcttccgcag
40681 agtctattg tttactctcc ttatttgtea acgggacaac tgaagtcaga aaaggacatg
40741 gcttatggca tcaagcgta gcaaaatggt ctctataaca tgtaccgtac aggtgttctg
40801 tctaaaaaag aatacagga ctataaggct tatccgattc aaaaggattt tattcaaccg
40861 ggaagtgcga tagtaataa tcacgattac ctttattaca cgggtttagc ggaatcctaa
40921 aaagcatgt atagctattt gattaagcga gataagggtg ctagtcgtga tttgaaaaat
40981 gacgagacta aggtctgcta tgaagagaga gccttaacag aattgcaaca ggggtggctat
41041 accatcacca caaccattaa taagcctatt tacaatgcga tgcagacagc ggcagctcag
41101 tttggtggct tgtagatga tggcactcgt acagttcaaa tgggaaatgt cttgacagac
41161 aatgcgactg gtgctgtgtt aggttttggt ggtggtagag attatgctct gaatcaaaat
41221 aatcatgctt tcaatacagt tagatcgcca ggttctagca ttaaaccgat aatcgcttat
41281 ggtctgcta ttgatcaagg tttaatgggg agtgctagcg ttttgcttaa ttaccaaca
41341 acttactcga ttggccaaaa aatcatgcat gctgatagtg aaggaaacag catgatgcca
41401 cttcaagagg ccctaaatac ttcttggaa atcccagctt tttggacaca gaaattactg
41461 cgtgaaaaag gggctgatgt cgaaaattat atgacaaaaa tgggttataa gattgcagac
41521 tactcgattg aaagtttacc tctagggggc ggtattgaag tctcggttgc tcaacaaacc
41581 aatgcttacc aaatgctttc aaacaatggc ttatatcaaa agcaatatat tgtagataag
41641 attactgcta gcgatggtac agtcgtttac aaacatgaaa ataagccaat tcgtattttt
41701 tctgcagcaa cagctacgat tttacaagaa ttgttgagag gtccgattac ttcaggcgct
41761 acgactactt tcaagaaccg tttggcggct attaatccgt ggcttgctaa tgctgatgg
41821 attggtgaaga ccggaacaac tgagaattat acggatgttt ggctagtctt gtctactcca
41881 aaagttacct taggcggttg ggcaggacat gatgacaata cctcattagc gccattaaca
41941 ggatataaca ataattctaa ttaccttgcc tatttagcta atgccattaa tcaggccgat
42001 cccaatgtta ttggagtagg gcaacgtttc aacttagatc caggagtcat taaggcgaat
42061 gtcttgaaag caacagggtt acaaccagga actgttaatg tcaatggaca tactttttct
42121 gttggtggag aaatgaccac cagtctatgg tcccaaaaag gaccgggggc tatgacttac
42181 cgatttgcta ttggtggcac ggtatgcgat tatcaaaaag cctgggggaa cttcgggttc
42241 agaaaaaatt aggttgccat ttatcgataa aaagggtata atagtaataa ctatttgcg
42301 tccaatctag ctgaaatatt gtccagttag gaagaacagc agttaaatca cactgataaa
42361 gtcagattta gctgctcttt ttgtgtctat ttttagaaaa gatagggttt gtaacctata
42421 tttaaatatt ctaaaaatta acatttaggg caaatgataa cttagttgcg atttgctgaa
42481 acagcaaagc ttaaatagaa gaaggagcta aaaacttggc aggacatgaa gttcgatacg
42541 gaaaacaccg tacacgtcgt agcttttcaa gaatcaaaga agttcttgat ttaccaaat
42601 ttgattgaaat tcaaaactgac tcatttcaa agtttctcga ttcaggtttg aaagaagtat
42661 ttgaagatgt acttcttatt tcaaaactta cggatactat ggaacttgaa tttgttggtt
42721 acgaatttaa agaacctaaa tatacccttg aagaagctcg tatccacgat gcaagttatt
42781 ctgcaccaat ctttgttacc ttccgtttgg tcaataaaga aactggtgag attaaaactc
42841 aagaagtctt ctttgggtgat ttcccaatca tgacggaaat gggtaacctt attatcaatg
42901 gtggtgaacg tatcatcggt tctcagttgg tgcgttctcc aggtgtttat ttcaacgata
42961 aagttgataa aaacggtaaa gttggttacg gatcaacagt gattcctaac cgtggggctt
43021 ggttggaatt agagactgac tcaaaagaca ttgcctacac tcgtattgac cgtaccgcta
```

```
43081 agattccatt cacaaccttg gttcgtgccc ttggtttctc aggtgatgat gaaattgttg
43141 atatcttttg tgaaagcgac cttgttcgta ataccattga aaaagacatt cacaaaaatc
43201 caagtgattc tcgtacagac gaagccctta aagaaattta cgagcgtctt cgtccagggtg
43261 agccaaaaac tgcagatagc tctcgtagtc ttttgattgc gcgtttcttt gatgcacgtc
43321 gttacgattt ggctgcgggt ggtcgttaca aagtgaacaa aaaacttaat atcaagactc
43381 gtcttttgaa ccaaatcatt gctgaaaacc ttgtggatgc tgaactggc gaaatttttg
43441 tagaagctgg aactgagatg actcgtagcg tcatcgaatc catcgaagaa caccttgacg
43501 gtgatttgaa caagtttgtt tacacaccaa atgattacgc tgtggttact gaaccagttg
43561 tccttcaaaa gttcaagggt gtgtcaccaa ttgatcctga tcgtgtagta actattgttg
43621 gtaatgccaa tccagatgat aaggttcgtg cattgacacc tgctgatatt ttggcagaaa
43681 tgtcttactt cttgaacctt gctgaaggct ttggaaaagt tgacgatatt gatcacttgg
43741 gtaaccgtcg tatccgtgcc gttggtgaat tgcttgccaa ccaattccgc atcggtcttg
43801 ctctgatgga gcgtaacgtg cgtgagcgta tgtctgttca agacaacgat gtgtaaacac
43861 cacaacaaat catcaatatc cgtcctgtca cagcagctgt caaagaattc ttcggttcgt
43921 ctacgttgtc acagttcatg gaccacacaa acccattgtc agagttgtct cacaaacgtc
43981 gtttatctgc cttaggacct ggtggtttga cacgtgaccg tgctggttat gaggttcgtg
44041 acgtgcatta cacgcactat ggccgtatgt gtccgattga aacacctgaa ggaccaaaca
44101 ttggtttgat taataacttg tcttcatttg gacatcttaa taaatatggt ttcattccaa
44161 caccttaccg taaggttgac cgtgcgactg gtagggtaac taacgaaatt gtttggttga
44221 ctgctgatga agaagacgag tacacagttg cacaggccaa ttcgaaacta aacgaagatg
44281 gcacttttgc tgaagaaatc gttatgggtc gtcaccaagg taataacca gaattttctg
44341 caagtgttgt tgatttcgtt gacgtttccc ctaaacaggt agttgctgtt gcgacggcat
44401 gtattccttt cttggaaaac gatgactcca accgtgccct catgggtgcc aacatgcaac
44461 gtcaggctgt gccattgatt gatccaaaag caccatatgt tggactggt atggaatatc
44521 aagctgcccc tgactcaggc gctgcggtga ttgctcagca caatggtaaa gttgtctttt
44581 ctgatgctga aaaagtggaa atccgtcgtc aagatggctc gcttgatgtt taccacatta
44641 ccaaatcccg tcgttcaaac tcaggaacag cctataacca acgcaccctt gttaaagtag
44701 gagacattgt tgaaaaagg gatttcacg ctgatggacc ttctatggaa aatggtgaaa
44761 tggctcttgg acaaaaccca gtcgttgctt acatgacttg ggaaggttat aactttgagg
44821 atgcggttat catgagttag cgccttgtga aagaagatgt ctacacatct gttcacttgg
44881 aagaattcga atctgaaacg cgtgatacaa aacttggtcc tgaagaaatc actcgggaaa
44941 tcccaaatgt tgggtaagaa gccctcaaag accttgacga aatgggcatt atccgtatcg
45001 gtgctgaggt taaagaaggc gacatcttag taggtaaagt cacacctaaa ggtgaaaaag
45061 acctttctgc tgaagaacgt ttacttcacg ccatctttgg ggataaatcg cgtgaagtgc
45121 gtgatacctc acttcgtgtc cctcacggtg gtgatggtat cgttcgtgat gtgaaaatct
45181 ttacacgcgc taacggcgat gaattgcaat cagggtgtta tatgcttgtg cgtgtttaca
45241 tcgctcaaaa acgttaaatc aaggtcggag ataaaatggc cggctcgtac ggaacaccag
45301 gtgtcgtttc acgtattgta ccagttgaag acatgccata ccttcagac ggaacaccag
45361 ttgacatcat gttgaacctt cttgggtgtc catcacggat gaatatggtt caggttatgg
45421 aacttcacct tggatggctt gctcgtaatc ttggcattca cattgcaaca cctgtctttg
45481 acggggcttc atcagaagac ctttgggaca ctgttcgtga agctggtagt gatagcgatg
45541 ctaagacggt cctttatgat ggacgtactg gtgaaccatt tgacaaccgt gtatccgttg
45601 gtgtcatgta tatgatcaaa cttcaccaca tggttgatga taaacttcatt gcccgttctg
45661 taggaccata ctcaattgtt acccaacagc cacttggtgg taaagctcaa tttggtggac
45721 aacgttttgg ttgatggag gtttgggccc ttgaagctta tgggtgcatc aatgtttctt
45781 aagaaatctt gacctacaag tcggtgacg tcacaggacg tttgaaagcc tatgaagcga
45841 ttactaaagg taaaccaatt ccaaaaccag gtgtaccaga atccttccgt gttcttgtaa
45901 aagaattgca atcgcttggc cttgatatgc gtgtgcttga cgaggatgat aatgaagtgg
45961 aacttcgtga tcttgatgaa ggtgaagacg atgatattat gcatgttgac gatctcgaga
46021 aggcacgtga aaaacaagct caagaaaccc aagaagtttc tgaacaact gacgaaaaat
46081 aagcaatcaa ttcttattaa ataattatct actggtctgg ggcaaaggcc ccaggaaactg
46141 gtaaatcat caaaggcaga aaggtaaaac tagtgggtga cgtaaatcgt tttaaaagta
46201 tgcaaatcac attagcctca ccaagtaagg tccgttcatt gtcttatggt gaagttaaaa
46261 aacctgaaac aatcaactac cgtacattaa aaccagaacg tgaaggactc tttgacgaag
46321 tcatcttttg tccaacaaaa gactgggaat gtgcgtgtgg taagtacaaa cgtatccgtt
46381 ataaagggat cgtttgtgac cgctgtgggg ttgaggtaac tcgtgctaaa gtacgtcgtg
46441 aacgtatggg tcacattgag ttaaaagctc ctgtatcaca tatctggtat tcaaaagggg
46501 ttccatctcg tatgggattg actcttgata tgaagtctcg tgccctgaa gaagtcatct
46561 atttgcggc ttatgtggc atttgataaa aagatacacc gcttgaacca aaatcattat
46621 taacagaacg tgaataccgt gaaaaactac aagagtatgg tcatgggtca tttgtcgcta
46681 agatgggtgc tgaagccatt caagatctct tgaaacgtgt ggacttggca gctgaaatcg
46741 ctgaattaaa agaagagttg aaatctgctt ctggtcaaaa acgattaaa gcagttcgtc
46801 gtttagacgt ccttgatgcc tttacaaaat ctggaaataa accagaatgg atggttctta
46861 acatcctgcc ggttattcca ccagatcttc gtccgatggg tcaattggat ggtggtcgtt
46921 ttgcggcatc agacttgaat gacttgatcc gtcgtgtgat taaccgtaat aaccgtttgg
46981 cacgtttggt agaacttaat gccctgggca tcattgttca aatgaaaaa cgaatgcttc
```

47041 aagaagccgt tgatgctttg attgataatg gtcgtcgtgg tcgtccaatc actggaccag
47101 gaagtcgtcc attgaaatca ttgagccaca tgcttaaagg taaacaaggg cgtttccgtc
47161 aaaacttgct tggtaaaccgt gtagacttct ctggacgttc cgttatcgct gttggtccaa
47221 cccttaaaat gtatcaatgt ggtgtcccac gtgaaatggc tatcgagctt tttaaacat
47281 ttgtaatgcg cgaaattgtt gccaaagaat atgctggtaa cgttaaagcc gctaaacgta
47341 tgggtgaacg tggcgacgaa cgcactctgg atactctaga agaagttatc aaagaacacc
47401 cagtccctact taaccgcgca ccgactcttc acagacttgg tattcaggct tttgaaccg
47461 ttcttattga cggtaaggca cttcgtcttc acccacttgt gtgtgaggcc tacaatgccg
47521 acttcgatgg agaccaaatg gccatccacg tgccactttc agaagaagca caagctgaag
47581 ctctgtctttt gatgcttgct gcagagcaca tcttgaaccc taaagatggt aaaccagttg
47641 ttaccccatc tcaggatatg gttcttggtg actactatct tacgatggaa gatgctggtc
47701 gcgaaggcga aggcatgatc ttcaaggata aagacgaagc tgtgatggca tatcgtaatg
47761 gctatgctca tcttcatagt cgtgtgggta ttgctgttga cagcatgcca aacaaacctt
47821 ggaagacag tcaaaagacat aaaatcatgg tgacaactgt tggtaagatt ctcttaacg
47881 acatcatgcc agaggacctt ccttacctcc aagagccaaa caatgccaac ttgacagaag
47941 gaacacctga taaatacttc cttgaacctg gtcaagacat ccaagaagtg attgacggct
48001 tagacatcaa tgtgccattt aagaagaaaa acctcggtta catcattgct gaaaccttca
48061 aacgtttccg tacaacagaa acatcagcct tccttgaccg cttgaaagac cttggttact
48121 accattcaac ccttgctggt ttgacagtgg gtatcgctga cattcctggt attgataata
48181 aagctgaaat cattgatgct gctcaccatc gtgttgaaga aattaacaaa gccttccgtc
48241 gtggtttgat gacagatgat gaccgttatg ttgccgttac aacaacatgg cgtgaagta
48301 aagaagccct tgaaaaacgt ctaattgaaa cacaagatcc taagaacca atcgttatga
48361 tgatggactc aggtgcccggt ggtaacatct ctaacttctc acagcttgct ggtatgcgtg
48421 gtttgatggc tgctcctaac ggacgcatca tggaacttcc tatcttgta aacttccgtg
48481 aaggtttgag cgttttgtaa atgttcttct caaccacggg tgcacgtaaa gggatgaccg
48541 atacggccct taaaaacagc gactcagggt atcttactcg tcgtttggtt gacgttgccc
48601 aagatgttat cattcgtgag gacgattgtg gactgatcg tggctcttct atccgtgcta
48661 ttacagatgg taaagaagt accgaaacgc ttgaagtgcg tcttcaaggc cgttacacac
48721 gtaaatcagt caaacaccct gaaactgggt aagtcctgat tgggtgctgac caattaatca
48781 ctgaagacat ggctcgtaag attgttgatg cagggtgtga agaagtgacc attcgttctg
48841 tctttacctg tgcgactcgt catggtgtct gccgtcactg ttatggtatc aacttgga
48901 ctggtgatgc tgttgaagt ggtgaagcag ttggtactat tgctgccaa tctatcgtg
48961 agcctggtac tcagcttacc atgcttacct tccacacggg tgggtgtagc tcaaataccg
49021 atatcaccca ggtcttctct cgtattcaag agatctttga agcacgtaat cctaaagggg
49081 aagcggatcat tactgaagt aaaggaatg tcgtcgagat tgaagaagat gcgtcaactc
49141 gtaccaagaa agtctacgtt caaggaaaaa ctggcatggg cgaatatgtc gtaccattta
49201 cagcacgtat gaaagtga gttggcgacg aagttaatcg cggagctgcc cttacagaag
49261 ggtcaattca accgaaacgt ctccctgaag tgcgtgatac cttgtcagtt gaaacgtacc
49321 ttcttgacga agtacaaaaa gtttaccgta gccaaagggg agaaatcgga gacaaacacg
49381 ttgaggtaat ggttcgcaa atgcttcgta aagttcgtgt catggatcca ggtgatacag
49441 acctccttcc aggtacactt atggatattt ctgatttcac agatgctaac aaagatattg
49501 ttatctctgg tggatttctt gcgacatctc gtcctgttct tatgggtatt actaaggctt
49561 cccttgaaac caattccttc ttatcagctg catccttcca agaaacaact cgtgttctta
49621 cagatgctgc tatccgtggg aagaaagacc acttacttgg tcttaaagaa aatggtatca
49681 ttggtaaaaa catcccagca ggtactggta tggcgcgcta ccgtaacatt gaaccacaag
49741 cgatgaatga gattgaagt attgatcata cagaagtctc agcagaagca gaataatctc
49801 atgaaagagt ccttaggggc tcttttttgt ctgagtttgt tggcagttaa aagcattgac
49861 aatcagtcct agtcccaatg agcagatggt tttcaaaata cttatgattt agctataata
49921 atgcataaga ggaatgggta atgtgttatg tatcaagtaa ttaaaatgta tgggtgattg
49981 gagccttggt ggttcacgta tggatggcaa gacgatatta tagatgagca acaatttagt
50041 gactggcaag aagcgcttga ttattttaat caagaatggc agcgcatgaa agctattttt
50101 cctagttatc atagccaaaa gaatttggtt gctacttttt gggaaaaaga agataaaaga
50161 tgggtcgagg actgtgacga agatttgacg cagtttcatt ctcttttact ccttaaaaaa
50221 aaagatattg taccaagcaa taattatata cctgaatttg aacaacgaaa tgattcacca
50281 caggtagctt atctttgcaa gttaaaccct taagtgtttg ttaaaaaaaa aataagttaa
50341 aagaaaatat cacttcttat gatattttct ttttttggtt acgaataaaa

//

[Disclaimer](#) | [Write to the Help Desk](#)
NCBI | NLM | NIH